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THE CITY OF GRAND FORKS

WELL AND AQUIFER PROTECTION PLAN

Prepared by

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PROJECT 3191

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1. INTRODUCTION

This report presents the results of a drinking water source water assessment and proposed groundwater protection plan for the City of Grand Forks (the City), which relies exclusively on groundwater for its drinking water.

The work represents the second portion of an integrated groundwater management strategy being developed by the City. The first part of the strategy included an assessment of the sustainability of the water utility including determination of long-term well capacity and the impacts of mutual well interference and water quality issues on meeting current and future water demand in the City. The work was informally referred to as the “Nitrate Study” as it specifically addressed concerns regarding spatial and temporal trends of nitrate concentration in groundwater within the aquifer. The work was undertaken to minimize operational costs, maximize the lifespan of the existing water supply wells, and prioritize action items for well maintenance, replacement, and augmentation of water supply, if needed. The output of the first part of the strategy was a report entitled “City of Grand Forks Management of Community Water Wells”, and was completed in January 2013.

The following report represents the second part of the strategy and is intended to fulfill conditions attached to the City’s permit to operate a water system issued by the Interior Health Authority (IHA). The work was completed with the assistance of a Technical Advisory Committee that included City Staff and the drinking water officer from IHA. The purpose of this second study is to provide for a reasonably thorough source water assessment of the City’s wells and provide the framework for establishing a groundwater protection program (GWPP) for the Grand Forks Aquifer (the Aquifer) and the supply wells that the community relies on for drinking water.

The report has been organized into sections that generally follow the structure of the Drinking Water Comprehensive Source to Tap Assessment Guide (S2TAG), which was developed by the

Provincial Ministry of Healthy Living and Sport in 2010. There are eight sections (modules) in the S2TAG, of which four (1, 2, 7 and 8) have been addressed in this report. The study also recognizes the requirements outlined in the British Columbia Ministry of Forests, Lands and Natural Resource Operation's (FLNRO) Well Protection Toolkit, or WPT, developed in 2006. Some tables are embedded in the document. Most tables and all figures are attached at the end of the report.

It is recognized that a GWPP is only one part of the more generic source water quality objectives that the IHA is requiring of water purveyors under their Source Water Quality Improvement Program. The other requirements include the completion of an audit to determine if existing assets (wells) are compliant with the requirements of the Ground Water Protection Regulation, or GWPR (BCMOE, 2005), and an assessment to determine if the source water is considered to be Groundwater Under the Direct Influence of Surface Water (GWUDI) and/or Groundwater at Risk of Containing Pathogens, or GARP (MOH, 2012).

The primary authors of this report were Remi Allard, P.Eng. and Kathy Tixier, P.Eng., both senior hydrogeologists with Piteau Associates Engineering Ltd. (Piteau). Corporate level support and senior technical review was provided by Mr. David Tiplady, P.Eng., Principal Hydrogeologist at Piteau.

Authorization for this work was given by Ms. Sasha Bird, ASCT, Manager of Development and Engineering for the City in September 2012.

2. BACKGROUND

The City derives municipal water from a network of five water wells, all of which are completed in the same Aquifer and located north of the Kettle River within an area bounded by 19th Street to the east and Northfork Road to the west. In addition to the City wells, the Aquifer is heavily used for potable and agricultural water supply by several water utilities including the Sion Improvement District (SID), Grand Forks Irrigation District (GFID), Covert Irrigation District (CID) and several smaller community water supply systems.

The Province has completed several studies to characterize the Aquifer and delineate capture zones for individual wells (Wei 1983a, 1983b, 1999, 2001). To compliment this work, the City and the local irrigation districts formed an aquifer protection committee in 1995 and commissioned a review of land use in the area. The committee also undertook an inventory of contaminants within the capture zones established by the Province (Allard et al, 2003), and provided public education on water quality protection initiatives for the Aquifer. A formal aquifer or source water protection plan was never completed and the committee disbanded in 2005/2006.

The City completed a groundwater development study in 1999 to look at the supply capacity of existing wells and to identify options for increasing the system delivery capacity (Kerr Wood Leidal, 1999). At the time of the 1999 study, there were only four wells in the system, as Well 1 had been decommissioned in the late 1980s after it became contaminated with petroleum hydrocarbons from nearby retail fuel outlets. In 2000, a new supply well was constructed near the existing Well 3, and henceforth referred to as Well 3A.

More detailed study of the Aquifer has been completed by the Province (FLNRO) and Simon Fraser University (SFU), specifically to refine capture zones and assess the vulnerability of the Aquifer to both surface contamination and climate change (Allen, 2004; Wei et al., 2010). The 2010 report includes a groundwater flow model developed by Dr. Diana Allen at SFU. The model and report represent the most comprehensive information available for the Aquifer and therefore much of the description of the Aquifer contained in this report has been abridged from the work completed by Dr. Allen and Mr. Wei.

The most recent work relating to the Aquifer includes a 2012 review of the water quality monitoring network that the Province maintains in the Grand Forks Aquifer (Allard & Manwell, 2012), the development of the technical portion of a watershed management plan for the Kettle River (Summit, 2012), and the report completed as the first part of this study (Piteau, 2013).

3. STUDY METHODOLOGY

This Source Water Assessment and Groundwater Protection Plan has been prepared based on a combination of requirements from both the S2TAG and WPT. The S2TAG provides a structured and consistent approach to evaluating risks to drinking water and serves as a tool for water systems to develop a comprehensive understanding of the risks to drinking water safety and availability, how to operate more effectively, and how to produce the best possible water quality.

The S2TAG is comprised of eight modules, listed as follows:

- Module 1 - Delineate and characterize drinking water sources
- Module 2 - Conduct contaminant source inventory
- Module 3 - Assess water supply elements
- Module 4 - Evaluate water system management, operation and maintenance practices
- Module 5 - Audit water quality and availability
- Module 6 - Review financial capacity and governance of water system
- Module 7 - Characterize risks from source to tap
- Module 8 - Recommend actions to improve drinking water protection

The scope of work addressed by this study comprises modules 1, 2, 7 and 8. By default, the City may need to address Modules 3 to 6 in the course of operating and maintaining the water system and in response to other requirements listed in the operational permit for the system issued by IHA.

The WPT was developed jointly by the Ministry of Environment (BCMOE) and the Ministry of Health (MOH) in 2000, and consists of a six-step process to assist communities that utilize groundwater to better manage and protect their drinking water sources. The six steps are outlined below. A reference to the corresponding S2TAG Module is provided in brackets.

1. Form a Community Planning Team, also known as a technical advisory committee, or TAC (this is not clearly outlined in the S2TAG);
2. Define the capture zone (recharge area) of the community wells (Module 1 in S2TAG) ;

3. Map potential sources of pollution in the capture zone (Module 2 in S2TAG);
4. Develop and implement protection measures to prevent pollution (Module 8 in S2TAG);
5. Develop a contingency plan against any accidents (Module 8 in S2TAG); and
6. Monitor, evaluate and report on the plan annually (Module 8 in S2TAG).

3.1 TECHNICAL ADVISORY COMMITTEE

The Technical Advisory Committee (TAC) for the project including representatives from the following:

- City of Grand Forks – Sasha Bird and Doug Allin
- Interior Health Authority (IHA) – Jessie Bhattie and Wayne Radomske
- Ministry of Forestry, Lands and Natural Resource Operations (FLNRO) – Skye Thomson

The TAC met on two occasions in the fall of 2012 and winter of 2013. The discussions and meetings were informal and were attended by representatives of the City and IHA. The first meeting was to kick off the project and discuss the objectives of the work, specifically compliance with the requirements covered under the IHA Permit to Operate. It was also agreed that the work should follow the structure of the S2TAG document, which is the preferred methodology by IHA for source protection planning. The second meeting was utilized to:

- to visit each well site;
- discuss the implications of the aquifer being classified by the BCMOE as highly developed and highly vulnerable to contamination, plus the significance of historical bacteriological test results for the wells and distribution system;
- discuss the implications of the current draft version of the GWUDI/GARP document regarding the treatment of groundwater; and
- reach consensus regarding frequency and location of water quality sampling.

There were also several telephone discussions between Piteau and IHA staff during December 2012 and April 2013 regarding the contents of draft versions of the report.

3.2 OVERALL APPROACH

The project followed the approach in the S2TAG with minor modification to be consistent with the WPT. In particular, the assessment of risk (Module 7) followed the guideline and the concerns of noted in Section 3.1. The TAC agreed that public consultation would not be completed at this time, although it is expected to be a crucial activity with other groundwater stakeholders in the area in the future, particularly when the issues relevant for source protection planning in the area have been implemented. The methodology utilized is summarized as follows:

- i) Assemble stakeholder/technical advisory committee (WPT Step 1);
- ii) Collection and review of available data including previous groundwater reports, mapping, flow records, water quality, etc; (WPT Step 2);
- iii) Conduct site reconnaissance and review of the existing water system with the City;
- iv) Delineate source capture zones and meeting #1 (S2TAG Module 1);
- v) Complete contaminant source inventory (S2TAG Module 2);
- vi) Characterize risks for source to tap – meeting #2 (S2TAG Module 7);
- vii) Recommend actions to improve drinking water protection (S2TAG Module 8);
- viii) Prepare and submit draft report (WPT Step 4);
- ix) Modify draft report and submit final report;
- x) Coordination of project meetings with TAC; and
- xi) Completion of final report.

4. SOURCE ASSESSMENT – DELINEATION AND CHARACTERIZATION OF WATER SOURCES (MODULE #1)

This module includes delineation of the well capture zones (protection areas) using capture zone analysis and hydrogeologic mapping, the characterization of the individual well sources, and a review of existing groundwater quality data.

4.1 OBJECTIVES AND METHODS

The objective of Module 1 is to provide the framework for the source protection assessment, including a characterization of the water sources and water system, the water system setting and governance context, and the assessment/delineation of the proposed protection area. Methods applied included a review of existing reports and data, and capture zone mapping for the supply wells as further described in the following sections.

4.2 HYDROGEOLOGICAL SETTING

The Grand Forks Aquifer (the Aquifer) has been studied in great detail and the intent of this assignment is not to provide a comprehensive summary of the work completed, nor to expand on the current understanding of hydrogeology in the area. The most comprehensive source of information on the Aquifer is presented in a report entitled “The State of Understanding of the Hydrogeology of the Grand Forks Aquifer” (Wei et al., 2010), which describes the physical setting and climate of the area, along with a summary of the hydrogeologic studies completed on the Aquifer. Much of the information provided in the report by Wei et al. is based on the studies completed by the Province and by Dr. Diana Allen at SFU.

Figure 1 presents a plan of the Study Area showing the extent of the Aquifer, the Granby and Kettle rivers and the generalized direction of flow in the Aquifer.

The Kettle River Valley and adjacent portions of the Granby River Valley are underlain by alluvial and glacial drift consisting mainly of sand, gravel, silt, and clay. The resultant aquifer, which hosts the wells, is commonly referred to as the Grand Forks Aquifer. The Aquifer is irregular in shape and covers the entire valley where the Kettle and Granby rivers confluence. It generally

follows the base of the valleys along the two rivers, which are limited in extent by the surrounding bedrock hills. The source aquifer is generally encountered at between 15 to 60m depth and ranges from confined to unconfined in character.

Recharge to the Aquifer is derived from precipitation plus lateral flow contributions from the Granby River Valley (from the north) and more predominantly from the Kettle River Valley (from the west). Additional recharge is provided via the hydraulic connection between the Aquifer and the rivers, lateral flow (mountain block recharge) from the surrounding bedrock highlands and via infiltration of precipitation and irrigation return flow. The Aquifer has a strong hydraulic connection to the Kettle River.

FLNRO have classified the Aquifer as IA, indicating a relatively high degree of development as compared to productivity of the Aquifer, along with high demand and potentially high yields being available. The classification also denotes a relatively high vulnerability to contamination. The high vulnerability ranking is primarily based on the water level in the Aquifer being located within 10m of ground surface, the granular nature of the Aquifer and the unconfined to semi-confined nature.

In 1989, elevated nitrate levels were first identified in the Aquifer, with most of the higher concentration areas located to the south of the Kettle River and therefore south of the limits of the City. There is also an area to the north of the City wells where nitrate levels, while lower, are increasing. Nitrate levels in the City wells are relatively stable and well within drinking water quality standards, as shown by a maximum nitrate level of 1.6 mg/L measured in Well 2 in 2005, and lower concentrations that are declining or stable.

Several studies have been completed by the Province to characterize the spatial and temporal water quality in the Aquifer. The BCMOE maintains a program of monitoring water quality in several wells throughout the entire Aquifer. The sources of nitrates have yet to be clearly determined. In summary, there is ongoing concern regarding nitrate contamination in the Aquifer and this is the primary reason why the aquifer has been designated as highly vulnerable. However, all of the City wells are completed with a well screen assembly set at greater than 30m depth and, with the exception of Well 5, have penetrated clay above the section of the aquifer where the screen assembly has been set. Given the proximity of Well 5 to Well 4 and the

number of clay layers penetrated by Well 4, it is conceivable that Well 5 also encountered clay but this was not reported on the well log. Regardless, the screen assembly in Well 5 is set below 40m depth. The vulnerability of the wells is discussed further in Section 4.5, where an assessment of the likelihood of the wells being Groundwater Under the Direct Influence of Surface Water (GWUDI) or Groundwater at Risk of Containing Pathogens (GARP) is presented.

The City and the irrigation districts in the area have also been tracking water quality in response to a requirement by the IHA to do so.

4.3 WATER SOURCE CHARACTERIZATION

The following provides an overview of the available information regarding the physical characteristics for each well and the historical water quality. The FLNRO web-hosted WELLS database contains Well Tag Number (WTN) records for most of the City wells and copies of these records are provided in Appendix A.

A summary of selected characteristics of each well is presented in Table 1. The locations of the City wells are shown on Fig. 2.

4.3.1 Well 1

This well, which is also referred to as the Arena Well, was decommissioned sometime during the late 1980s following contamination by long-term gasoline leakage from filling stations located near the junction of Highway 3 and 19th Street. The well was located at approximate coordinates 393186E / 5431550N, at the northeast corner of what is currently a parking lot at the east end of the hockey arena. It was drilled in 1957 and reportedly completed to 11m depth. The well was deepened in 1981 to 18m depth. The yield of the well was in the order of 19 L/s to 25 L/s. A record for this well exists in the FLNRO WELLS database as WTN 14654. There is no Well Identification Plate (WID Plate) attached to this well.

4.3.2 Well 2

This well is also known as either the Henning or Hutton well and is located along 75th Avenue at approximate coordinate's 392451E/5431284N. The well was drilled in 1965 and completed with 200mm diameter casing and screens to 30.5m depth. The approximate static water level in the well is at 12m below the top of well casing (mbtoc) and the 2.4m long screened section in the well extends from 28.0 mbtoc to 30.5 mbtoc. This well is equipped with a submersible pump and has been historically pumped at approximately 25 L/s. It is the most efficient of all the City wells. The well is located within a below ground concrete bunker and WID Plate number 316 is affixed to the well casing inside the bunker. The corresponding record for this well in the FLNRO WELLS database is WTN 19226.

4.3.3 Well 3A

This well was initially known as the Old Airport Well and also as Well 3, until the new Well 3 was constructed in 2000. The location is approximately 410m southeast of Well 2, along 68th Avenue, at approximate coordinates 392726E/5430956N. This well was drilled in 1969 and completed with 500mm diameter casing and a 6.1m long screen. The well completion included an engineered gravel pack surrounding the well screens. The approximate static water level in the well is at 8.0 mbtoc and the 6.1m long screened section in the well extends from 27.9 mbtoc to 34.0 mbtoc. The well collar is inside a pump house and encased within the concrete floor of the pump house building. The well is equipped with a submersible pump. Due to the close proximity of Well 3, the water level in this well is lowered when Well 3 is being pumped. This well has been historically pumped at 75.7 L/s and very rarely at the same time as Well 3. WID Plate number 353 is affixed to the outside of the door entering the pump house. The corresponding record for this well in the FLNRO WELLS database is WTN 22427.

4.3.4 Well 3

This well is located approximately 22m northwest of Well 3A at coordinates 392704E/5430959N. It was drilled in 2000 by Columbia Water Wells and completed with 400mm diameter casing and screens to 32.3m depth. The approximate static water level

in the well is at 9 mbtoc and the 6.1m long screened section in the well extends from 25.0 mbtoc to 31.1 mbtoc. There is a 1.2m long section of solid pipe at the bottom of the well, to provide a sump for any sand accumulations. The well collar is located within a pump house and encased within the concrete floor of the pump house building. The well is equipped with a vertical shaft turbine pump. Due to the interference with Well 3A, this well has been historically pumped at 30 L/s and very rarely at the same time as Well 3A. WID Plate number 352 is affixed to the outside of the door entering the pump house. A record for this well does not exist in the FLNRO WELLS database; however, a copy of a well completion diagram for the well is included in Appendix A.

4.3.5 Well 4

This well was formerly known as the Arena South Well and is located approximately 860m east of Well 2 at the northwest corner of the junction of 19th Street and 70th Avenue. The coordinates for the well are 393313E/5431319N. This well is 22m southwest of Well 5. It was drilled in 1977 and completed with 200mm diameter casing and screens to 59.1m depth. The approximate static water level in the well is at 11.0 mbtoc and the 12.2m long screened section in the well extends from 40.5 mbtoc to 59.1 mbtoc. The well collar is located within a small kiosk and the well is serviced with a submersible pump. Due to the close proximity of Well 5, the water level in this well is lowered when Well 5 is being pumped and a recommendation was provided for operation of this well at a reduced rate (Piteau, 1988). The well has been historically pumped at 41.5 L/s and very rarely at the same time as Well 5. This well is the least efficient of all the City wells. WID Plate number 354 is affixed to the outside of the kiosk which sits atop this well. The corresponding record for this well in the FLNRO WELLS database is WTN 37325.

4.3.6 Well 5

This well is located approximately 22m northeast of Well 4 at coordinates 393327E/5431337N. It was drilled in 1988 and completed to 59.4m depth. The 400mm diameter casing extends to 44m depth and the 250mm diameter screens from the base of the casing to the full depth of the well. The screen section is 15.4m long and surrounded by gravel pack material. The approximate static water level in the well is at 11.0 mbtoc. This well is located within a pump house building and is serviced with e

vertical shaft turbine pump. Due to the close proximity of Well 4, the water level in this well is lowered when Well 4 is being pumped and therefore this well has been historically pumped at a rate of 69.4 L/s. Very rarely is the well operated concurrently with Well 4. The well is the second least efficient well operated by the City. WID Plate number 355 is affixed to the entry door to the pump house building. There is no record for this well in the FLNRO WELLS database. A copy of the well log from the original 1988 construction report by Piteau is included in Appendix A.

4.3.7 Water Quality

The major water quality concern in the Aquifer relates to nitrate-nitrogen (nitrates). FLNRO currently operates an ambient water quality monitoring network in the Aquifer that includes water supply wells operated by the City and the other large water utilities that source water from the same Aquifer. Such utilities include, among others; SID, GFID and CID. Spatial and temporal water quality data are available for nitrate, chloride, iron, sodium, potassium, sulphate, arsenic and conductivity. The data was recently reviewed (Allard & Manwell, 2012) and the results indicate there are several localized areas in the Aquifer that exhibit elevated nitrate levels, in many cases in excess of the Maximum Acceptable Concentration (MAC) outlined in the Guidelines for Canadian Drinking Water Quality, or GCDWQ (Health Canada, 2010). The source of the nitrates has not clearly been differentiated between agriculture (fertilizer application) versus human (effluent disposal via septic systems).

Using a blended data set from FLNRO and the City, plots of spatial and temporal water quality for nitrates, potassium, sulphate and chloride were prepared for the area north of the Kettle River, where all of the City wells are located. Included in the analysis are Sion Well 3, WTN 35526, and WTN B, which are wells from the Province's monitoring networks where elevated nitrate levels have been regularly noted. The most important well for the City in relation to water quality trends is Well 2, which has been sampled most frequently and is in closest proximity to agricultural activity (immediately north).

A contoured plot of maximum nitrate concentrations combined with time plots of nitrate for each well is presented on Fig. 3. Similar plots for sulphate, potassium, sodium and chloride, all of which can be associated with fertilizer application, are presented on Fig. 4

through Fig. 7. Sodium and chloride can also be associated with effluent disposal and are therefore considered to be indicative of human waste.

The lowest values for all water quality parameters are in the south where the Aquifer has a strong hydraulic connection with the Kettle River. The highest values for nitrate, sodium and chloride are to the north of the City wells, in FLNRO observation well WTN 35526, which is at Boundary Hospital. The highest sulphate values are also to the north at WTN B, which is another FLNRO observation well located near the junction of Northfork Road and 6th Road. Nitrate, sodium and chloride values in both of these wells are increasing with time, whereas sulphate and potassium levels are relatively stable.

Nitrate levels have been increasing in WTN B and WTN 35526 since 2006, with the most recent values in 2010 being 4 mg/L and 6 mg/L, respectively. Nitrate levels were also increasing in City Well 2 between 2000 and 2006, reaching a maximum of 1.58 mg/L. Since 2006, the nitrate values in Well 2 have decreased to 1.04 mg/L (last sampled in 2009). The only other City well that has been regularly tested for nitrates is Well 3A, with values of 0.1 mg/L and 0.2 mg/L being consistently noted in this well.

Ongoing testing is being undertaken in the City wells for the complete suite of parameters required by IHA for potability. The data is sparse, but does indicate the existing wells produce groundwater meeting applicable guidelines in the GCDWQ for the parameters tested. More important is that the data indicate nitrate levels in the area of the City wells are well below the GCDWQ and not increasing. Water quality data for the City Wells is summarized in Table 2.

Spatial and temporal water quality data for the wells operated by the City are discussed in more detail in a report prepared for the City by Piteau in January 2013 entitled, "City of Grand Forks Management of Community Water Wells". Another report which looks at water quality data for the entire Grand Forks aquifer was prepared by Allard & Manwell in 2012 entitled, "Review of Ambient Water Groundwater Quality Networks in the Okanagan Kootenay Region".

4.4 COMPLIANCE WITH GWPR

In 2005, the Ground Water Protection Regulation (GWPR) came into force in BC (Province of BC, 2005). This regulation includes standards for wellhead protection, well caps and covers, flood proofing and deactivation/closure of water wells. All of the City wells were constructed prior to enactment of this regulation.

The GWPR requires that new wells, constructed since 2005, must have a secure cap and that well casing extends at least 0.3m above the surrounding ground surface or above the base of a concrete pit. The top of the well casing must be higher than the local floodplain, and a surface annular seal must exist to at least 4.5m depth below ground surface in areas where bedrock does not exist at surface. These well construction requirements are intended to reduce the potential for surface water entering the top of the well, or along the outside of the well casing, thereby reducing the potential for contaminating groundwater in the source Aquifer.

A review of the well construction records for the City wells indicates that surface casing is present in Well 3, Well 3A, Well 4, and Well 5. It is not possible to verify if the annulus between the surface casing and production casing has been grouted in Well 3. Surface annular seals were installed during the commissioning of Well 3A, Well 4, and Well 5. Well 2 is encased in concrete at surface, but there is no evidence to suggest this well has surface casing, or a surface annular seal. The concrete offers some protection at the wellhead. The geology encountered above 15m is not noted on the driller's logs for Well 2 and it is unknown if any additional protection would be gained from installing a surface annular seal in the well to the required 4.5m depth.

With regards to flood proofing, none of the City wells lie within the extent of the floodplain associated with the Kettle River (Fig. 8). Well 2 is located within a 3m deep concrete bunker and the elevation of the base of the concrete bunker is marginally above the elevation of the nearest extent of the floodplain.

4.5 PRELIMINARY GWUDI/GARP ASSESSMENT

The screening followed the protocols of the BC Ministry of Health – Guidance Document for Determining Ground Water at Risk of Containing Pathogens, or GARP, including Ground Water

Under Direct Influence Of Surface Water, or GWUDI (MOH, 2012). Groundwater at risk of containing pathogens (GARP) is defined herein as any groundwater supply likely to be contaminated from any source of pathogens. Potential sources of pathogens include sewage effluent discharge to land, agricultural waste stockpiles and surface water. Groundwater under direct influence of surface water (GWUDI) is defined herein as groundwater that is hydraulically connected to surface waters and susceptible to contamination from pathogens.

GWUDI wells may not be “at risk of containing pathogens”, or GARP under certain conditions. The guidance document provides a staged approach from initial screening of a groundwater source to preliminary and more advanced hydrogeological investigations to assist drinking water officers in determining, where necessary, appropriate treatment requirements for groundwater sources. The guideline's investigative process consists of four stages:

Stage 1: Screening Tool

Stage 2: Preliminary Hydrogeological Investigation

Stage 3: Advanced Hydrogeological Investigation

Stage 4: Long-term Water Quality Monitoring

A preliminary assessment of GWUDI/GARP potential was completed using the screening tool from the guideline document, which reviews several criteria including the nature of the aquifer, depth of the screens in a well, potential for inundation under high river levels, historical bacteriological water quality results and proximity to surface water. The screening tool assessment was completed for all of the operating wells, plus test well TW 99-2 and a location proposed as part of this study for a new well (Well 6). The results of the preliminary assessment indicated that none of the wells are likely to be GWUDI/GARP.

Copies of individual screening forms for each well are presented in Appendix B, and a summary of results is listed in Table 3.

One of the criteria used for the initial GWUDI/GARP screening relates to historical bacteriological water quality test data. This data has been reviewed and there were some instances where sampling within the distribution system generated positive results. However, no samples taken

directly from any wells produced a positive result. A table summarizing the historical results of bacteriological testing for wells in the City is presented in Appendix C.

4.6 WELL CAPTURE ZONES

To efficiently manage and protect a groundwater supply, an understanding of the well “capture zone” and the “time of travel” zones are required. A “capture zone” is the area of an aquifer from which all groundwater will eventually arrive at the well. A “time of travel” zone is the area of an aquifer from which groundwater will be derived from a well in a predefined amount of time. For example, if a non-retarded contaminant is released within the one-year time of travel zone, it can be expected to arrive at the well within one year. Once the capture zone and time of travel zones are estimated, the appropriate monitoring and protective measures can be implemented.

As outlined in the WPT, capture zones can be determined using a variety of methods depending on the available information on the aquifer and well characteristics. Where the hydrogeology regime is simple, analytical solutions can be used to estimate capture ones. For more complex aquifers where an abundance of information is available, a groundwater flow model is often used.

A groundwater flow model developed by Dr. Allen at SFU (Wei at al., 2010 and Allen et al., 2004a/2004b) was used to assess the extents of capture zones for the City wells. The model was run using the historical pumping rates provided by the City. The main objective of this exercise was to identify the orientation of capture zones in relation to current land use in order to identify the possible source of impacts to water quality. A secondary objective was to identify potential future well locations where capture zones would not overlap with existing capture zones, thereby minimizing the potential for mutual well drawdown interference.

The modelling completed assumed that all wells were pumped continuously, although records provided by the City show that wells are used seasonally and intermittently. The resulting predictions for the extent of mutual well interference and the footprint area of the capture zones are therefore conservative. Capture zones were combined for the pair including Well 3 and Well 3A, plus the pair of Well 4 and Well 5, due to the proximity of these wells. The WPT suggests that capture zones be delineated for one-, five- and ten-year times of travel. The one-year time of travel is a higher priority area for monitoring and emergency response as sources of

contamination within this travel time can include biological (bacteriological) microorganisms and chemicals that are more mobile in the subsurface. Given the current uncertainty regarding the transport and attenuation of microorganisms in the subsurface (ACATCH, 2011), the one-year time of travel zone, which includes microorganisms, is considered prudent.

The one-year capture zone for well pair 3/3A extends to the Kettle River, as does the one-year capture zone for Well 2. These capture zones will not increase in size as the river represents a constant source of water. The one-year capture zone for well pair 4/5 extends to an abandoned oxbow channel to the south of 68th Avenue, between 21st Street and 19th Street. The oxbow is hydraulically connected to the Kettle River and therefore this capture zone for well pair 4/5 is also not expected to increase in size. Therefore, five- and ten-year time of travel capture zones will cover the same footprint areas as shown for the one-year time of travel.

A capture zone was also delineated for a new well with the ultimate location of this well chosen to minimize mutual well drawdown interference with existing wells. The new well location is referred to as Well 6.

A summary of the model inputs, the pumping scenarios investigated and the results is presented in Appendix D. Figure 9 is a plot of the extent of the one-year time of travel capture zones for the City wells.

IHA provided recommendations regarding the capture zones determined for the City wells, specifically that the ultimate source protection plan for the City would be “strengthened by grouping all land within, between and around all active well capture zones into one large protection area”. This would encompass an area bounded roughly by the Kettle River to the south, 17th Street to the east, 75th Avenue to the north and Northfork/Franklin Road to the west. The additional area included is dominated by residential, park and agricultural land use. Given that the delineation of capture zones is subject to limitations in the understanding of the hydrogeology of the aquifer coupled with the dynamic nature of water levels and direction of flow due to recharge and pumping, the adoption of a larger area is considered practical.

In addition to the capture zones that have been determined using the groundwater flow model and the proposed larger well protection area, IHA noted the provision in Module 1 of the S2TAG, that all wells have a 100m radius well protection zone established. All of the one-year time of travel capture zones for City wells extend 100m both up-gradient and down-gradient of each well location.

5. SOURCE ASSESSMENT – CONTAMINANT SOURCE INVENTORY (MODULE #2)

As described within the S2TAG, Module #2 comprises a contaminant source inventory that identifies inherent risks to water quality as well as describing land uses, human activities and other potential contaminant sources that could affect source water quality. The term “contaminant source” is defined within the S2TAG to mean both existing and potential sources of contamination.

5.1 OBJECTIVES AND METHODS

The objective of Module 2 is to inventory existing and known potential contamination sources in the delineated capture zones and then to summarize what is known about these sites so that the potential risk to drinking water may be assessed further in Module 7.

In 2003, Golder Associates (Golder) completed an inventory of potential sources of contaminants for all of the large water utilities using the Aquifer (Allard et al, 2003). The inventory was based on field reconnaissance and the review of a comprehensive list of information sources as follows:

1. BC Site Registry Database (accessed online);
2. Locations of Underground storage tanks (as discussed with the City Fire Chief);
3. Locations of on-site sewage disposal (septic tank and fields in areas not serviced by municipal sewer connection);
4. Locations of storm water disposal to ground (City shapefiles showing extent of coverage);
5. Existing and abandoned water wells (FLNRO WELLS database);
6. Transportation of dangerous goods along major roads;
7. Sand and Gravel extraction;
8. Surface water interactions (studies by others);
9. Landfills and dumping;
10. Fertilizers and pesticides (studies by others);
11. Historical business activities(historical archives, books, anecdotal reports by City staff and long-time residents);

12. Current business activity and zoning; and
13. Other potential sites of concern.

Golder reported that the potential contaminants reported for wells operated by the City were related primarily to residential land use which predominates in the capture zones for all wells (2, 3, 3A, 4 and 5). There was also commercial land use identified along Highway 3, which could influence Well 2. Other activities in the area included a school, hotel, and agricultural field (Well 2); houses and vacant fields (Well 3 and 3A); and the school and hockey arena (Well 4 and 5). The commercial businesses along Highway 3 included service stations (Super Save, Chevron and a former Texaco). The Site Registry included information on eight potentially contaminated sites within the preliminary capture zones for all of the City wells that were under assessment and/or remediation. In addition, three FLNRO spill sites were located within the capture zones for the City wells. It is important to note that the capture zones considered in 2004 were developed using analytical equations and as such were significantly larger, owing to conservative nature of the calculations used.

An airfield formerly existed at Dick Bartlett Park, where Well 4 and Well 5 are located. It was suggested that fuel and oil leaks may have occurred at this site. Most of the residential properties within this area are serviced by the City water and sewer system. Potential contamination risks in the vicinity of these wells may be associated with the commercial properties along Highway 3, and possibly residential and agricultural properties. Potential contaminants of concern may include lawn care chemicals, and products associated with equipment and vehicle maintenance and fueling.

Recognizing the detailed work already completed by Golder in 2003, updating of information was required only from the following sources:

1. An updated search of the BC Site Registry which contains information on potentially contaminated sites and spills;
2. Interviews with local residents with knowledge of current and historic land use including:
 - a. City of Grand Forks staff,
 - b. Mr. Bob Franks. Retired well driller familiar with many water wells in the area,

- c. Mr. Steve Babakaioff. Long-time resident of the area and General Manager of Sion Improvement District (SID).
3. A windshield survey of properties in and around the capture zones for the City wells.

Table 4 includes an initial list of potential contamination sites derived from the review of potential contamination sources that could impact the quality of groundwater within the delineated capture zones. Information included in Table 4 includes:

- Type of potential contamination sources within the capture zone;
- Nature of contaminants that have been, or potentially could be released;
- Location of potential contaminant sources relative to well locations and the extent of the capture zones; and
- Contaminant transport mechanisms.

5.2 BC SITE REGISTRY SEARCH

A search of the BC Site Registry Database was completed for a 5 km radius centred in the area where the City wells are located (UTM coordinates 392611E, 5431404N). The search area included the entire footprint areas for all of the capture zones established for the City wells. As shown in Table 5, the results were compared against the results from a similar search completed by Golder in 2003 (Allard et al, 2003). In total, 25 site registry records were identified and detailed reports were requested for some of the sites to determine the status of activities of those sites.

Only one site falls within the capture zone for a City well and that is Site ID 7773, which is a former rail line right-of-way (ROW) that has been remediated by the City at the northeast corner of Highway 3 and 27th Street. The lot is now occupied by Extra Foods. Information on this site was supplied by City staff indicating the contaminant of concern was copper in soil, which is common throughout southern BC as railway ballast was often blast or waste rock sourced from copper mines in the Southern Interior of the Province.

All other sites listed in the table fall outside of capture zones for the City wells, primarily to the south of the Kettle River, to the east in the old downtown area of the City and to the north within

the industrial area along Donaldson Avenue. Using the site identification (Site ID) number listed in Table 5, the locations of all sites are shown on Fig. 10. Also shown on Fig 10 are the locations of potential contamination sources identified in the source to tap assessment tables. All of the sites identified from the Site Registry search were added to Table 4 as potential sources of contamination.

5.3 WINDSHIELD SURVEYS

Piteau completed windshield surveys of properties within the capture zones for the City wells in November 2012 and again in March 2013. A summary of the sites and specific issues identified is as follows:

- The abandoned oxbow, which is now a prominent drainage channel that borders to the east of the Columbia Western Rail Trail and McCallum View Drive. This being a former channel of the Kettle River, it is likely that the oxbow is hydraulically connected to the river. During flood events or during spring freshet, this area is prone to very high groundwater levels and the potential exists that drainage contaminated by local urban runoff could directly communicate with groundwater along the oxbow. The eastern extent of the capture zone for Well 4/5 is within 75m of the oxbow.
- Agriculture in the field located to the northeast of 75th Avenue and Northfork/Franklin Road. This area is located down-gradient of the capture zone for Well 2 and has limited influence on water quality in the well. However, higher concentrations of nitrate identified in FLNRO observation wells that surround this property infer that the field is the most likely source of nitrates.
- Kal Tire and Extra Foods Gas Bar are located along Highway 3 and within the northern limits of the combined capture zone for Well 3 and 3A. These businesses represent possible point source contamination due to presence of petroleum hydrocarbons and vehicle maintenance chemicals such as oil and grease.
- The Super Save Gas Bar along the north side of Highway 3 and across from Extra Foods. This fueling station is located within the capture zone for Well 2.

- Nuisance dumping, construction material storage and vehicle storage in vacant lot at southeast corner of 27th Street and 75th Avenue. This site is in the capture zone for Well 2 and within 25m of the well itself.
- Recreational complex at southeast corner of Highway 3 and 19th Street. The hockey arena and curling rink rely on cooling plants which use refrigerants. This site lies within the northern extremity of the combined capture zone for Well 4/5.

When combined with the results of the Site Registry survey, existing and future land uses in the area have mostly a low to moderate potential to impact the underlying aquifer. All of the sites identified during the windshield survey were added to Table 4 as potential contaminant sources.

These sites are also shown on Fig. 10.

5.4 ZONING WITHIN THE CAPTURE ZONES FOR THE CITY WELLS

The current land use zoning within the City, as per the 2011 Sustainable Community Plan (SCP), is shown on Fig 11. Multiple types of zoning exist within the capture zones for the City wells including residential, agricultural, commercial, industrial and parkland. Of concern for source protection are areas zoned commercial and industrial because some land uses that may be allowed in these areas could potentially impact groundwater quality. Many of the properties along the Highway 3 corridor are zoned commercial. There are also agricultural zoned areas within the capture zones for Well 2, Well 3 and 3A, and future Well 6. Future, more intense agriculture in these areas should be discouraged.

Future moderate to high density residential development, if not serviced by municipal sewers, would also pose a possible concern if sited within the capture zones for the City Wells. It is understood that the City has a policy prohibiting un-sewered development on lots smaller than 1 ha (2.47 acres).

There are no areas zoned industrial within the capture zones for the City wells.

5.5 HAZARD IDENTIFICATION

Information regarding potential contaminants listed in Table 4 was used to develop Table 6, which is a summary of potential hazards, or threats to source water (groundwater) quality. The information in Table 6 represents a linkage between the source assessment completed in Module 2 of the S2TAG process and the characterization of risk to be completed in Module 7. The additional information provided in Table 6 includes:

- Potential effects at the source level; and
- Existing preventative measures and associated barriers at the source level.

The Summary of Potential Hazard Identification Table also includes additional potential hazards, which, among others could include nearby (buried) sanitary sewer mains and other natural or anthropogenic features that may exist now or in future. The majority of the City is serviced by sewers. Treated sewage is discharged into the Kettle River at the east end of Grand Forks, which is 2 km east and down-gradient of the capture zone for Well 4/5.

A summary of the hazards identified within capture zones and issues that relate specifically to each City well are as follows:

1. Well 2: The capture zone for this well is relatively narrow and elongated in the up-gradient direction to the west, towards the Kettle River. A major transportation corridor (Highway 3) is intersected. This is a potential source for accidental spills. Commercial land use along this corridor includes several hazards relating to petroleum hydrocarbons (garage, fuel sales and maintenance). There is a community sewer line located immediately up-gradient of the well. The down-gradient portion of the capture zone extends northeast and into an agricultural area. Nitrate is regularly detected in this well.
2. Well 3 and 3A: These wells are located very close to each other and influence each other when pumped concurrently. The combined capture zone for these two wells is much less elongated than Well 2, but extends up-gradient to the west and towards the Kettle River. The up-gradient portion of the capture zone is predominantly within an agricultural area and nitrate is regularly detected in these wells at lower concentrations than measured in Well 2. The down-gradient portion of the capture zone is adjacent to Highway 3 and the

commercial properties along the highway are potential sources of petroleum hydrocarbon contamination.

3. Well 4 and 5: These wells are located very close to each other and influence each other when pumped concurrently. The combined capture zone for these two wells is relatively symmetrical and located within parkland and residential land use areas. The down-gradient and off (side) gradient portion of the capture zone extends to the north and northwest, adjacent to Highway 3. The commercial properties along the highway are potential sources of petroleum hydrocarbon contamination. Nitrate is regularly detected in these wells at lower concentrations than measured in Well 2.
4. Future Well 6: The capture zone for this potential well location is relatively wide and extends in the up-gradient direction to the southwest, towards the Kettle River. The land use within the capture zone predominantly agricultural.

6. SOURCE ASSESSMENT – CHARACTERIZE RISKS FROM SOURCE TO TAP (MODULE #7)

Module #7 of the S2TAG arguably forms the most important step in the source-to-tap assessment process. In the context of water systems, it is noted that low probability / high magnitude and high probability / low magnitude risk events can result in adverse effects to human health and safety, and present risk management concerns to community water suppliers. The very low probability but high consequence events cannot be reliably predicted or prevented, and so are typically managed by appropriate emergency response and contingency planning.

6.1 RISK CHARACTERIZATION OBJECTIVES AND METHODOLOGY

The main objective of Module 7 is to synthesize all of the water system information (strengths and vulnerabilities) into a comprehensive assessment of the major water supply elements and the system as a whole. A qualitative evaluation of risk typically involves an analysis of both the probability of a given risk event as well as the magnitude of the risk. This study has followed the structured approach to the assessment of risk as presented in the S2TAG. For there to be a drinking water risk, there must be a hazard present, such as a contaminated site or a land use activity with potential to contaminate, as well as a consequence which could be the infiltration of the contaminant into the well and aquifer near the well. The potential risk that may be associated with each identified hazard is qualitatively characterized as the likelihood multiplied by the consequence if the hazard actually occurred. The resulting risk characterization is summarized in the following sections. The likelihood of a given risk event has been assigned a value of 'A' to 'E' according to the S2TAG approach presented in Table 7.

Table 7: Assignment of Risk Categories (Likelihood Level)

Level	Descriptor	Description	Probability of Occurrence in Next 10 Years
A	Almost Certain	Expected to occur in most circumstances	>90%
B	Likely	Will probably occur in most circumstances	71% - 90%
C	Possible	Will probably occur at some time	31% - 70%
D	Unlikely	Could occur at some time	10% - 30%
E	Rare	May only occur in exceptional circumstances	<10%

The relative magnitude of consequences associated with the occurrence of a given risk event have been assigned a value of 1 to 5 according to the S2TAG approach presented in Table 8. Table 9 presents a matrix of likelihood-consequence used to identify the risk level that is summarized in Table 10. Very little site-specific information exists about the potential contamination sources and the details of the respective drinking water hazards beyond the possibility that a spill to ground could occur, or could have occurred in the past. Therefore, the assignment of likelihood and consequence is relatively subjective. The precautionary principle and hydrogeological judgment were used in assigning likelihood and consequence levels for those sites considered to be likely up-gradient, or relatively close to a City well.

Table 8: Relative Levels of Consequence Description

Level	Descriptor	Description
1	Insignificant	Insignificant impact, no illness, little disruption to normal operation, little or no increase in normal operation costs
2	Minor	Minor impact for small population, mild illness moderately likely, some manageable operation disruption, small increase in operational costs
3	Moderate	Minor impact for large population, mild to moderate illness probable, significant moderation to normal operation but manageable, operating costs increase, increased monitoring
4	Major	Major impact for small population, severe illness probable, system is significantly compromised and abnormal operation if at all, high level monitoring required
5	Catastrophic	Major impact for large population, severe illness probable, complete system failure

Table 9: Risk-Likelihood Consequence Matrix

Level		Consequences				
		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
A	(almost certain)	Moderate	High	Very High	Very High	Very High
B	(likely)	Moderate	High	High	Very High	Very High
C	(possible)	Low	Moderate	High	Very High	Very High
D	(unlikely)	Low	Low	Moderate	High	Very High
E	(rare)	Low	Low	Moderate	High	High

6.2 RISK CHARACTERIZATION SUMMARY AND TABLE

The process of risk characterization is subjective, and takes into account the likelihood and the consequence using the matrix in Table 9. In many cases involving specific small point-source sites, whether or not a likelihood of contamination is low or moderate or high is difficult without site-specific information or groundwater quality data from monitoring points located down-gradient of each site. Therefore, for some of the hazards, instead of attempting to assign a level of risk to each individual site we have grouped the identified drinking water hazards as explained below. Prior to completing the Risk Characterization, potential drinking water hazards identified in Table 6 were grouped into one of four categories as follows:

Table 10: Grouping of Drinking Water Hazards

Drinking Water Hazard Group	Description	Hazards included from Fig. 10 and from Tables 4 + 5
Group 1	Potential point source contamination sites, mostly petroleum / fuel storage and agricultural related, mostly along Highway 3 and within capture zones or up-gradient of City wells	1, 2, 5, 36, 37, 38, 41, 42
Group 2	Potential point source and non-point source contamination sites, located outside capture zones or not up-gradient of City wells	1 and 35,
Group 3	Potential point and non-point sources of contamination located outside capture zones and/or at considerable distance (> 0.5 km) from one or more of the City wells	4, 6, 10-16, 19, 22-25, 29, 33
Group 4	Stand-alone drinking water hazards. These do not fit conveniently into a group and/or require a specific risk management response, but on-going cognizance of the location and extent of these activities is warranted.	3, 7, 8, 9, 17, 18, 20, 21, 26-28, 30-32, 34, 39, 40, 43, 44

The rationale for the first three groupings is that very little site-specific information is available for any one site or hazard (which may not be site-specific), and many of the sites within each group present a similar type of water quality threat and so may possibly be managed for using similar approaches, such as monitoring or appropriate land-use planning.

Table 11 presents the risk characterization analysis based on four Drinking Water Hazard Groups including what are referred to as “stand-alone” hazards. The grouping of hazards is necessary in that site-specific information is lacking on potential contamination sources, and together, the grouped hazards present a similar potential threat to groundwater quality and it is our opinion the

risk from these sites cannot be accurately differentiated without further data. However, the potential risk these sites pose to the district's wells can be managed by monitoring and other actions, which are described in the Module 8 discussion.

6.3 SYSTEM STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS

The foregoing hazard identification and risk analysis focused on identifying threats to the drinking water sources (wells). Considering the entire water system, the factors with potential to influence drinking water quality and availability both currently and into the future, are discussed below in a Strengths, Opportunities, Weaknesses and Threats (SWOT) analysis.

System Strengths

- Natural groundwater quality is good.
- All City wells are relatively deep (> 30m) and are not likely to have microbiological contamination in groundwater (GWUDI/GARP);
- The City system has been in existence for many years and has years of experience in operating and maintaining the water system.
- The source water capacity of the Aquifer is likely sufficient to accommodate a minor amount of growth, without adverse impacts on the Aquifer or on flow in the Kettle and Granby rivers.
- There are currently five operating wells and the potential for a sixth well. The likelihood that more than one well at any time will be not functioning, due to contamination or equipment failure, is remote. The system therefore has redundancy to meet the majority of demand, in the event one well is shut down.
- Infrastructure is in place to provide appropriate contact time and chlorine residual within the distribution system. Chlorination is currently being done at the request of IHA.

System Weaknesses

- Limited coordination and collaboration between the City and regional government regarding land use surrounding the limits of the City and in some cases within the capture zones for City wells.
- Sampling is undertaken predominantly within the distribution system and more frequently for biological pathogens only, as opposed to a more comprehensive suite of potability indicators. Sampling should be undertaken at source (each well) more frequently
- Limited coordination and collaboration between the City and irrigation/improvement districts regarding water consumption from the Aquifer.
- With multiple well sources and no dedicated transmission lines to reservoir sites, there are significant cost challenges to providing primary disinfection.

System Opportunities

- Any SCP updates for the City or OCP updates for the Regional District of Kootenay Boundary (RDKB) could incorporate source protection considerations in land use planning and development of servicing bylaws for on-site sewer and water supply (groundwater use).
- The City and RDKB could consider implementing demand management initiatives such as water conservation through metering and public awareness.
- Continue to collaborate with FLNRO with ambient water quality monitoring throughout the Aquifer and encourage other water users in the area to participate. Increased monitoring of the Aquifer is an opportunity for better understanding groundwater quality and quantity over the long term.

System Threats

- Some of the capture zones for the City wells are within moderately to highly developed areas with multiple land uses permitted, and oversight of land use practices in these areas appears to be relatively limited.
- Nitrate has been identified in all areas of the Aquifer, including in the wells operated by the City. While not directly linked, agricultural activities are likely the largest contributor of nitrate into the Aquifer and the application of fertilizers (and pesticides) needs to be

monitored and managed in the future to eliminate the potential for long-term impacts to the Aquifer.

- A major transportation corridor passes through the area where the City wells are located, bisecting all of the capture zones. A chemical spill due to a transportation-related accident presents an inherent risk to the water system.

7. RECOMMENDED ACTIONS TO PROMOTE GROUNDWATER PROTECTION (MODULE #8)

7.1 OVERVIEW

This section provides recommendations for consideration to reduce the risk of groundwater impacts in the future as a result of future activities and events.

Table 12 summarizes the overall approach recommended for managing risks to drinking water and Table 13 provides a summary of the recommendations with cross-reference to the hazard identification number and/or hazard group, as well as the overall risk level associated with each hazard.

The risk characterization completed in Module 7 forms the basis for the risk management alternatives developed and assessed for Module 8. The management alternatives collectively provide a series of actions with suggested timelines to reduce and/or mitigate risks to drinking water quality.

Each recommendation is presented within the context of the existing measures that may or may not be in place already to address the identified drinking water hazard and its associated risk. Some potential hazards and specific sites are included in more than one sites are in more than one hazard group.

Table 12: Drinking Water Risk Management Approach

Drinking Water Hazard Group	Description	General Recommended Approach to Risk Management
Group 1	Potential point source contamination sites, mostly petroleum / fuel storage and agricultural related, mostly along Highway 3, within capture zones or up-gradient of City wells	<ul style="list-style-type: none"> • Incorporate once annual monitoring to detect petroleum and chemical parameters potentially present but not monitored for Well 2 and Well 3/3A are a priority for this action.
Group 2	Potential point source contamination sites, located outside capture zones or not up-gradient of City wells. Areas include downtown Grand Forks, along Highway 3 or in industrial area along Donaldson Avenue.	<ul style="list-style-type: none"> • Consider location of these sites in planning any future supply wells.
Group 3	Potential point-sources of contamination located outside capture zones and/or at considerable distance (> 0.5 km) from one or more of the City wells	<ul style="list-style-type: none"> • Consider location of these sites in planning any future supply wells, and possibly targeting these areas in for long-term groundwater monitoring.
Group 4	Stand-alone drinking water hazards requiring specific actions. May include both known and unknown present or future drinking water hazards associated with land use or potential changes in land use.	<ul style="list-style-type: none"> • See specific recommendations in Table 13 and Section 7.2 for discussion of each identified hazard.

Table 13: Summary of Key Recommendations

Hazard Ref. No. (From Table 10 or Table 4)	Drinking Water Hazard Source (s) Potentially Affected	Risk Level (Table 6)	Recommendations	Recommended Time Frame to Implement
Group 1	Hazard ID Sites 1, 5, 36, 37, and 38. Specific to Well 2 and Well 3/3A	Moderate to High	For well 2 and 3/3A, weekly monitoring for biological pathogens, quarterly monitoring for nitrate and annual monitoring for complete suite of potability indicators, plus total and dissolved metals, chlorinated and non-chlorinated volatile organic compounds (VOC), and petroleum hydrocarbons. Annually review activities at each source location and check integrity of sewer pipelines located up-gradient of City wells.	Immediate and ongoing
Group 1	Well 2	Low	Consider abandoning concrete bunker design in favor of a pump house or kiosk and extending well casing above ground. At same time, retrofit well with surface annular seal.	Next 1-3 years
Group 1	Hazard ID Site 2	Low	Consult with Ministry of Highways regarding the extent of the capture zone for Well 2 and request a spill response and emergency notification system for spills that occur within the capture zone.	Next 1-3 years
Group 1	41	Moderate	Video camera inspection of well casing and screens to verify integrity. Can be done in conjunction with regular well rehabilitation and pump maintenance.	Ongoing, each well every 3-4 years
Group 1	42	Moderate	Interact with and support FLNRO in documenting old wells and consider implementing a well closure bylaw with RDKB.	Next 3-5 years
Group 2	Hazard ID Sites 1 and 35	Low	For wells 4 and 5 and eventually 6, continue weekly monitoring for biological pathogens and implement annual monitoring for a complete suite of potability indicators. Annual monitoring for petroleum hydrocarbons at Well 3/3A, similar to requirement in Group 1. Bi-annually review business practice at Site ID 36 (Kal Tire).	Immediate and ongoing

Table 13: Summary of Key Recommendations (cont'd)

Hazard Ref. No. (From Table 10 or Table 4)	Drinking Water Hazard Source (s) Potentially Affected	Risk Level (Table 6)	Recommendations	Recommended Time Frame to Implement
Group 3	Hazard ID Sites 4, 6, 10, 11, 12, 13, 14, 15, 16, 19, 22, 23, 24, 25, 28, 29, 33	Low	Consider the locations of these sites in the planning for future well locations. Check BC Site Registry annually and consider modification (reduction of) the potential hazard ranking for these areas.	Immediate and ongoing
Group 4	17	Moderate	Consider decommissioning this well as per the requirements of the GWPR	Next 1-3 years
Group 4	3, 7, 8, 9, 43	Low to Moderate	Consider the location of these sites in the planning for any future well locations. Monitor current land use and changes in capture zones and areas immediately adjacent to capture zones through bylaws, land use planning.	Immediate and ongoing
Group 4	15, 18, 19, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34	Low	Annual dialogue with owners of properties to determine if remediation is underway or complete. If site under risk management (monitoring well data), request annual results.	Immediate and ongoing
Group 4	1	Low	Limit use of chemicals to control weeds surrounding channel. Consider limiting amount of water accumulated during spring (freshet) flooding	Next 3-5 years
Group 4	39	Low	Implement best management practices for storage and use of chemicals, particularly coolants.	Immediate and ongoing
Group 4	40	Low	Implement best management practices for storage and use of chemicals (fertilizers and pesticides). Develop application plan to optimize use of chemicals.	Optional
Group 4	20 and 44	N/A	No specific action proposed. Consider annual dialogue with owners to identify changes in land use or BMPs.	N/A

7.2 DISCUSSION OF RECOMMENDATIONS

Further to the information summarized in Table 13, the following provides some further discussion of the main recommendations to promote groundwater protection and address identified drinking water hazards.

1. Increase the frequency of sampling for biological pathogens (total and fecal coliform and *E. Coli*) at each well to compliment the ongoing sampling that is completed at various locations within the distribution system. Sampling at source (at the well) is critical to differentiate between contamination within the distribution system due to cross connection issues, as opposed to contamination of the source aquifer or due to well failure. Recognizing that wells are operated seasonally and intermittently, sampling for total and fecal coliform plus *E. Coli* should be undertaken at startup and then monthly for each well being utilized.
2. Due to the history of nitrate in the Aquifer, it is proposed that Well 2 and Well 3/3A be sampled for nitrate and nitrite on a quarterly basis. All other wells should be sampled for nitrate annually. Where wells are used seasonally, such sampling could occur soon after startup and at the end of a high use period. It is also recommended to sample each well annually for a complete suite of parameters required by IHA for determination of potability.
3. It is likely that Well 2 and Well 3 do not have a surface annular seal as these wells were constructed prior to 2005, when surface seals were not required in BC. This issue was identified in the GWUDI GARP screening assessment. Due to the nature of the Aquifer, specifically that the depth to a less permeable unit is substantially greater than 6m, the retrofitting of the wells to include a surface annular seal to the required 6m depth noted in the GWPR is not expected to offer any additional protection from potential contaminants at surface in the immediate area of the wells. If the concrete bunker vault is removed at Well 2, consideration should be given to extending the casing above ground and installing the surface annular seal.

4. Group 1 Recommendations:

- a. Consult with the Ministry of Highways regarding the extent of the capture zone for Well 2 and the sections where Highway 3 bisects the capture zone. Request a spill response and emergency notification system for spills that occur within the capture zone;
- b. Video camera inspections of well casing and screens on all City wells every three to four years to verify well integrity. This work can be done in conjunction with regular well rehabilitation and pump maintenance; and,
- c. Coordinate with FLNRO in documenting the location and status of old private wells and consider implementing a well closure bylaw within the City and within RDKB land adjacent to the City

5. Group 2 Recommendations :

- a. For Site Hazard ID 1 and 35 (Agricultural land use and Kal Tire commercial): Continue weekly monitoring for biological pathogens in Well 4, Well 5 and eventually in Well 6. Implement annual monitoring for a complete suite of potability indicators. Annual monitoring for petroleum hydrocarbons at Well 3/3A, similar to requirement in Group 1. Bi-annually review business practice at Site ID 35 (Kal Tire).

6. Group 3 Recommendations:

- a. For Site Hazard IDs 4, 6, 10-16, 19, 22-25, 28, 29, 33 (known and potential contaminant locations outside capture zones): Consider the locations of these sites in the planning for future well locations. Check Site Registry semi-annually and consider modification (reduction of) the potential hazard ranking for these areas.

7. Group 4 Recommendations:

- a. For Site Hazard ID 17 (City Well 1): Consider fully decommissioning this well as per the requirements of the Groundwater Protection Regulation (GWPR).

- b. For Site Hazard IDs 3, 7, 8, 9, 43 (potential sources resulting from deficient sustainability planning): Consider the location of these sites in the planning for any future well locations. Monitor current land use and changes in capture zones and areas immediately adjacent to capture zones through bylaws, land use planning.
- c. For Site Hazard IDs 18, 19, 22-34: Maintain annual dialogue with owners of properties to determine if remediation is underway or complete. If site continues under risk management (monitoring well data), request annual results.
- d. For Site Hazard ID 39 (City recreation complex): Implement best management practices for storage and use of chemicals, particularly coolants.
- e. For Site Hazard ID 40 (Evergreen Cemetery): Implement best management practices for storage and use of chemicals (fertilizers and pesticides). Develop application plan to optimize use of chemicals.
- f. Hazard ID 43 (future development): Develop and implement bylaws for development, zoning and subdivision. Follow the SCP and bylaws. Work collaboratively with other water suppliers and with RDKB on common issues and cross-jurisdictional land use interests.

7.3 OTHER RECOMMENDATIONS TO PROMOTE GROUNDWATER MANAGEMENT

These recommendations are not tied to specific drinking water hazards. These are considered proactive measures to improve knowledge of groundwater in the Grand Forks area:

1. Develop a Groundwater Awareness Area which encompasses the established capture zones for all City wells and all land within and immediately surrounding these zones. The proposed area is bounded roughly by the Kettle River to the south, 17th Street to the east, 75th Avenue to the north and Northfork/Franklin Road to the west. The additional area included is dominated by residential, park and agricultural land use. Any activity in the Groundwater Awareness Area should be noted and viewed with regards to the possible influence on the drinking water supply for the City.
2. Feedback has been provided on the current emergency response plan utilized by the City, the most important comment being that when an issue is identified at a well, the well

should be shut down immediately to limit the effects of pumping on the migration of contaminants towards the well. It has also been recommended that laminated response action cards be posted at each well to allow for appropriate response by the first person on site. Annual updating of the emergency response plan is critical, especially the provision of current contact numbers for appropriate government agencies and City staff, as well as police, fire fighting and local hospital staff.

3. Re-establish the Grand Forks Aquifer Protection Committee as a vehicle to promote environmental stewardship, help identify other potential groundwater pollution risks, develop policy and to protect groundwater resources for the entire aquifer. The committee should include representation from the City, Grand Forks Irrigation District, Sion Improvement District, other water utilities in the area, IHA, FLNRO and RDKB.
4. Implement local government bylaws to protect groundwater. Historically, aquifer protection plans have relied on public awareness and volunteer actions to protect groundwater resources. Such bylaws can further limit the densification of rural and semi-rural lot development that utilizes on-site sewage disposal to ground. Consider establishing a referral process for proposed land-use changes within capture zones, whereby the City is consulted on proposed re-zoning, building permit applications on commercially-zoned lands and for subdivision involving on-site sewage disposal. Such land use zoning, lot density and sewer servicing requirements would eventually be included in the SCP for the City. Recognizing it may be several years before the next version of the SCP for the City is developed, consider the development of the referral process as an interim measure.
5. Elevate awareness about the risks associated with the cumulative impacts of on-site sewage disposal systems such as contamination from pharmaceuticals and personal care products.
6. Increase awareness of cumulative impacts from contaminated urban runoff that directly recharges to ground via dry wells and infiltration swales located within aquifer recharge areas and within capture zones for wells. This can include chemicals used for residential lawn care and also for washing vehicles.

7. Consider undertaking Microscopic Particulate Analysis on all City wells. Such testing will further contribute to characterization of the Aquifer, specifically that the wells and Aquifer are not GWUDI/GARP.
8. Ongoing review, monitoring of this Well and Aquifer Protection Plan to ensure that the plan is kept up-to-date and that adaptive management of the plan is maintained such that new and developing threats to groundwater within the Grand Forks area are recognized and managed appropriately.

8. LIMITATIONS AND USE OF THIS REPORT

This report is prepared for the sole use of the City of Grand Forks and those parties represented on the technical advisory committee assembled for this assignment. Any use, interpretation, or reliance on this information by any third party is at the sole risk of that party, and Piteau accepts no liability for such unauthorized use.

Piteau has relied in good faith on information provided by the persons and organizations noted in this report. No responsibility is accepted for inaccuracies, deficiencies, or misstatements contained in this report as a result of inaccuracies, deficiencies, or misstatements in the information obtained from these sources, whether or not specifically noted by Piteau.

This investigation has been conducted using a standard of care consistent with that expected of scientific and engineering professionals undertaking similar work under similar conditions in BC. No warranty is expressed or implied. The findings of this assessment provide an overview of potential environmental concerns, both past and present. It is limited by the availability of information at the time the work was completed. Unreported waste disposal or other activities may have occurred that could have impacted the environment and groundwater quality.




9. CLOSURE

We trust that the professional opinions and advice presented in this document are sufficient for your current requirements. Should you have any questions, or if we can be of further assistance in this matter, please contact the undersigned.

Respectfully submitted,

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TABLES

TABLE 1
SUMMARY OF SELECTED WELL CHARACTERISTICS FOR CITY WELLS

Well	UTM Coordinate (Easting)	UTM Coordinate (Northing)	Year Drilled	Well Tag Number	Well ID Plate Number	Depth (m)	Production Casing Diameter (mm)	Depth to Top of Screen or Packer (m)	Length of Screen Assembly (m)	Depth to Static Level (m)	Available drawdown (m) ⁴	Historical Operation Rate (L/s)
Well 1 ²	393186	5431550	1956	14654	n.a.	18	unknown	15	3	9	6	25
Well 2	392451	5431284	1965	19226	316	30.5	400	28.0	2.4	12	15	25
Well 3	392704	5430959	2000	n.a.	352	32.3	500	25.0	6.1	9	15	30
Well 3a	392726	5430956	1969	22427	353	34.0	500	27.9	6.1	7	21	75.7
Well 4	393313	5431319	1977	37325	354	59.1	200	40.2	19.0	11	29	41.5
Well 5	393327	5431337	1988	n.a.	355	59.4	400	40.2	19.0	11	29	69.4
TW99-2	392616	5431957	1999	n.a.	n.a.	46.3	200	43.3	3.0	14	30	n.a.

NOTES:

- 1) n.a. indicates information not available or not applicable
- 2) Well 1 was decommissioned in the late 1980's
- 3) Production casing refers to casing that extends down to the screen assembly and limits the size of pump that can be installed.
Surface casing, if present, is larger diameter and does not extend to the full well depth.
- 4) Available drawdown is difference between static water level and top of screen assembly or packer.

TABLE 2
SUMMARY OF WELL WATER QUALITY FOR CITY WELLS

	WELL ID NO. DEPTH (m) SAMPLE DATE	Guideline for Canadian Drinking Water Quality (GCDWQ) ¹		Well 1 8.1 Aug-79	Well 2 30.5 Jul-07	Well 3a 34.0 Feb-07	Well 3 32.3 May-12	Well 5 59.4 Jul-07
	LAB: File No.:				Caro K7G0834	Caro K702605	Caro 2051450	Caro K7G0834
PARAMETER	UNITS	MAC/ IMAC	AO/OG					
PHYSICAL/CHEMICAL TESTS								
pH - Lab	pH		6.5-8.5	8.2	7.4	7.4	8.1	7.5
EC - Lab	mS/cm			600	450	277	256	446
Colour	CU		15		<5	<5	<5	<5
Turbidity	NTU	1	0.5	0.5	0.1	0.1	<0.1	0.2
Total Hardness	mg/L as CaCO ₃			293	205	148	133	188
Suspended Solids	mg/L							
Total Dissolved Solids	mg/L		500		272	150	147	253
DISSOLVED ANIONS (mg/L)								
Alkalinity	mg/L as CaCO ₃			220	168	132	120	174
Alkalinity: Bicarbonate	mg/L as HCO ₃			268				
Chloride	mg/L		250	9.8	8.14	1.9	2	7.72
Fluoride	mg/L	1.5		0.41	0.48	0.6	0.36	0.48
Sulphate	mg/L		500	75	43.1		15.5	45.8
Silicate	mg/L							
DISSOLVED CATIONS (mg/L)								
Calcium	mg/L			78	51	42.7	39	45.3
Magnesium	mg/L			23.9	18.8	10.4	8.6	18.1
Potassium	mg/L			2.2	2.08	1.72	1.6	2.13
Sodium	mg/L		200	9.9	9.74	7.37	6.2	9.93
TOTAL METALS (mg/L)								
Aluminium	mg/L		0.1/0.2		0.01	<0.01	<0.05	<0.01
Arsenic	mg/L	0.01			0.004	0.003	<0.005	0.008
Barium	mg/L	1.0			0.028	0.03	<0.05	0.032
Boron	mg/L	5			0.026	0.01	<0.04	0.022
Cadmium	mg/L	0.005			<0.00001	<0.00001	<0.0001	0.00002
Calcium	mg/L				51	42.7	39	45.3
Chromium	mg/L	0.05			0.002	0.002	<0.005	0.001
Copper	mg/L		1		0.002	0.001	<0.002	0.002
Iron	mg/L		0.3	0.13	0.12	0.13	<0.1	0.11
Lead	mg/L	0.01			0.0003	<0.0002	<0.001	<0.0002
Magnesium	mg/L				18.8	10.4	8.6	18.1
Manganese	mg/L		0.05	L .01	0.021	0.007	0.014	0.022
Mercury	mg/L	0.001			<0.00005	<0.00005	<0.0002	<0.00005
Potassium	mg/L				2.08	1.72	1.6	2.13
Selenium	mg/L	0.01			0.001	<0.001	<0.005	0.002
Sodium	mg/L		200		9.74	7.37	6.2	9.93
Uranium	mg/L	0.02			0.0029	0.0026	0.002	0.0037
Zinc	mg/L		5		0.006	0.012	<0.04	<0.005
NUTRIENTS (mg/L)								
Nitrate Nitrogen	mg/L as N	10			0.531	0.14	0.159	0.53
Nitrite Nitrogen	mg/L as N	1			<0.010	<0.010	<0.010	<0.010

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Notes:

- 1) GCDWQ = Guidelines for Canadian Drinking Water Quality (updated August 2012).
- 2) MAC = Maximum Allowable Concentration; AO = Aesthetic Objective; OG = Operational Guideline

TABLE 3
SUMMARY OF GUDI / GARP SCREENING LEVEL ASSESSMENT OF CITY WELLS

	Well 2	Well 3	Well 3a	Well 4	Well 5	TW99-2	New Well 6
Does routine analysis regularly indicate presence of Total Coliforms and/or <i>E. Coli</i> ?	<u>NO</u> Limited microbiological testing data are available for raw well water. Most of the samples are from locations in the distribution system and at the lift pumps associated with the existing storage reservoir. There are no positive bacteriological results for this well.	<u>NO</u> Limited microbiological testing data are available for raw well water. Most of the samples are from locations in the distribution system and at the lift pumps associated with the existing storage reservoir. There are no positive bacteriological results for this well.	<u>NO</u> Limited microbiological testing data are available for raw well water. Most of the samples are from locations in the distribution system and at the lift pumps associated with the existing storage reservoir. There are no positive bacteriological results for this well.	<u>NO</u> Limited microbiological testing data are available for raw well water. Most of the samples are from locations in the distribution system and at the lift pumps associated with the existing storage reservoir. There are no positive bacteriological results for this well.	<u>NO</u> Limited microbiological testing data are available for raw well water. Most of the samples are from locations in the distribution system and at the lift pumps associated with the existing storage reservoir. There are no positive bacteriological results for this well.	<u>NO</u> This well has never been activated and has not bee tested for bacteriological parameters.	<u>NO</u> This is a potential well location only.
Does the well have a history of turbidity problems?	<u>NO</u> There are no reports of turbidity problems or turbidity spikes.	<u>NO</u> There are no reports of turbidity problems or turbidity spikes.	<u>NO</u> There are no reports of turbidity problems or turbidity spikes.	<u>NO</u> There are no reports of turbidity problems or turbidity spikes.	<u>NO</u> There are no reports of turbidity problems or turbidity spikes.	<u>NO</u> This well has never been activated and has not bee tested for turbidity.	<u>NO</u> There are no reports of turbidity problems or turbidity spikes.
Is the well situated inside setback distances of the HHR, from possible source of contamination?	<u>NO</u> The well is not located within the setback distance required in the HHR.	<u>NO</u> The well is not located within the setback distance required in the HHR.	<u>NO</u> The well is not located within the setback distance required in the HHR.	<u>NO</u> The well is not located within the setback distance required in the HHR.	<u>NO</u> The well is not located within the setback distance required in the HHR.	<u>NO</u> The well is not located within the setback distance required in the HHR.	<u>NO</u> This potential well location is not located within the setback distance required in the HHR.
Does the well have an intake depth <15m below ground and located in floodplain / flood-prone area. OR well <100m outside the high-water mark or natural boundary of surface water feature and intake depth <15m below the high-water level?	<u>NO</u> This well is greater than 15m deep and is not within the floodplain of the Kettle River.	<u>NO</u> This well is greater than 15m deep and is not within the floodplain of the Kettle River.	<u>NO</u> This well is greater than 15m deep and is not within the floodplain of the Kettle River.	<u>NO</u> This well is greater than 15m deep and is not within the floodplain of the Kettle River.	<u>NO</u> This well is greater than 15m deep and is not within the floodplain of the Kettle River.	<u>NO</u> This well is greater than 15m deep and is not within the floodplain of the Kettle River.	<u>NO</u> This well is not intended to be less than 15m deep and will not be located within the floodplain of the Kettle River.
Does the well meet GWPR (Section 7) for surface sealing.	<u>NO</u> This well does not meet the criteria for a surface annular seal. Retrofitting the well with a seal is not expected to increase protection.	<u>NO</u> This well does not meet the criteria for a surface annular seal. Retrofitting the well with a seal is not expected to increase protection.	<u>NO</u> This well does not meet the criteria for a surface annular seal. Retrofitting the well with a seal is not expected to increase protection.	<u>NO</u> This well does not meet the criteria for a surface annular seal. Retrofitting the well with a seal is not expected to increase protection.	<u>NO</u> This well does not meet the criteria for a surface annular seal. Retrofitting the well with a seal is not expected to increase protection.	<u>NO</u> This well does not meet the criteria for a surface annular seal. Retrofitting the well with a seal is not expected to increase protection.	<u>YES</u> If and when this well is drilled it will have a surface annular seal.
Does the well meet GWPR (Section 10) for well caps and covers.	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>
Does the well meet GWPR (Section 11) for floodproofing.	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>
Does the well meet GWPR (Section 12) for wellhead protection.	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>	<u>YES</u>
Does the well have an intake depth <15m below ground and situated in a sand and/or gravel unconfined aquifer or fractured bedrock aquifer?	<u>NO</u>	<u>NO</u>	<u>NO</u>	<u>NO</u>	<u>NO</u>	<u>NO</u>	<u>NO</u>
Is the well completed in a karst bedrock aquifer?	<u>NO</u>	<u>NO</u>	<u>NO</u>	<u>NO</u>	<u>NO</u>	<u>NO</u>	<u>NO</u>
Is the well potentially GUDI / GARP?	NO	NO	NO	NO	NO	NO	NO

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- Notes:
- (1) The screening assessment followed the protocols of the BC Ministry of Health – Guidance Document for Determining Ground Water at Risk of Containing Pathogens, or GARP, including Ground Water Under Direct Influence Of Surface Water, or GWUDI (MOH, 2012).
 - (2) Copies of the GUDI / GARP Screening Tool results for each well are provided in Appendix B.
 - (3) HHR refers to health Hazards Regulation (BC Reg 216/2011) , under the BC Public Health Act . This pertains to separation distance of wells from a possible source of contamination
 - (4) GWPR refers to the Groundwater Protection Regulation (BC Reg 299/2004), under the BC Water Act. This pertains to well construction characteristics such as casing stickup, surface annular seal and location within a floodplain.
 - (5) Some of the information entered on the screening tool forms and subsequently used for the preliminary GUDI / GARP assessment has been provided by third parties and Piteau accepts no responsibility for the accuracy of such information.

TABLE 4
INITIAL IDENTIFICATION OF POTENTIAL HAZARDS

Hazard Ref. No.	Site Description	Location / Address	Closest City well with distance and location referenced to source (m)	Possible Contaminants of Concern	Contaminant Transport Method	Comments
A. Initial List of Potential Contaminants						
1	Agricultural activities	Up-gradient and down-gradient of wells 2, 3/3A	175m from Well 2 (down-gradient); 200m from Well 3/3A (both up and down-gradient), 80m from proposed Well 6 (down-gradient)	Nitrates, nitrite, ammonia, pesticides, herbicides, sodium, chloride, phosphate	Leakage to ground, flow through aquifer if reached	Potential contaminants are wide-area and not point source threats. Source area to north of Well 2 is close enough such that Well 2 should be monitored for these
2	Major transportation corridors	Highway 3	180m from Well 2 (Up-gradient) , 50m from Well 3/3A (side-gradient)	Salt, hydrocarbons, accidental spills, fire retardants	Leakage to ground, flow through aquifer if reached	Point source threat. Not shown as a specific "site" on figures, but Highway 3 and other major roads are corridors along which spills can occur
3	Urban runoff	Up-gradient and down-gradient of all City wells	Precise distances unknown	Petroleum hydrocarbons, chloride	Leakage to ground, flow through aquifer if reached	Both point source and wide-area threat. Not specifically shown on figures but likely present
4	Above Ground Storage Tanks (ASTs)	Up-gradient of Well 3/3A and side-gradient to Well 6 on agricultural properties	400m up-gradient	Petroleum hydrocarbons	Leakage to ground, flow through aquifer if reached	Point source threat. Likely present on larger farms to the southwest
5	Wastewater lines (buried sewer mains near wells)	Present both up-gradient and down-gradient of wells 2, 4 and 5	40m from Well 2 on 27 th Street (up-gradient), 8m from Well 5 on 19 th Street (down-gradient), 165m up-gradient from Well 4 in resident area	Microbiological pathogens, nutrients	Leakage to ground, flow through aquifer if reached	Point source threat. Not specifically shown on figures but present along roads in close proximity to some wells
6	Surface water interaction	Well 6	450m (up-gradient)	Microbiological pathogens	Induced leakage to aquifer from river caused by pumping	Distances between river and all wells are substantial and meet GWUDI guidelines
7	Storm water lines and drainage swales	Likely present within 50m of all wells	Precise distances unknown	Microbiological pathogens, nutrients	Leakage to ground, flow through aquifer if reached	Not specifically shown in figures, but likely present
8	Individual lot on-site wastewater disposal	Up-gradient of Well 3/3A, proposed Well 6	Precise distances unknown	Microbiological pathogens (E.Coli), nutrients	Leakage to ground, flow through aquifer if reached	Point source threat. Not specifically shown in figures, but likely present
9	Community wastewater disposal (trailer and modular home parks)	Potentially present in capture zones	Precise distances unknown	Microbiological pathogens (E.Coli), nutrients	Leakage to ground, flow through aquifer if reached	Point source threat. Not specifically shown in figures, but low to medium possibility present

TABLE 4
INITIAL IDENTIFICATION OF POTENTIAL HAZARDS

Hazard Ref. No.	Site Description	Location / Address	Closest City well with distance and location referenced to source (m)	Possible Contaminants of Concern	Contaminant Transport Method	Comments
10	Industrial wastewater disposal	Potentially present in capture zones	Precise distances unknown	Microbiological pathogens (E.Coli), nutrients	Leakage to ground, flow through aquifer if reached	Point source threat. Not specifically shown in figures, but low possibility these exist
11	Industrial chemicals and waste handling / storage	Up-gradient and down-gradient of wells 2, 3/3A on commercial lots along highway and on agricultural land	Precise distances unknown	Microbiological pathogens, petroleum hydrocarbons, solvents	Leakage to ground, flow through aquifer if reached	Point source threat. Not specifically shown in figures, but low to medium possibility present
B. Sites from BC Site Registry Search						
12	BC Site ID 2655 Canpar Plywood Plant	6590 Industrial Park Way (5431436N, 395464E)	1500m from Well 5 (down-gradient)	Waste oils, solvents, wood preservatives	Leakage to ground, flow through aquifer if reached	Down-gradient and hydraulically isolated from City wells due to Kettle River
13	BC Site ID 6227 Unifab Steel Fabricators	6050 2nd St (5430509N, 395446E)	2600m east and down-gradient from Well 5	unknown	Leakage to ground, flow through aquifer if reached	Down-gradient and hydraulically isolated from City wells due to Kettle River
14	BC Site ID 2219 Shell Food Corner	272 Central Ave (Hwy 3) (5432189N, 394849E)	1800m east and down-gradient of Well 5	Petroleum hydrocarbons	Leakage to ground, flow through aquifer if reached	Far removed from any City well and of no concern
15	BC Site ID 2487 Former Texaco Central	1866 Central Ave. (Hwy 3) (5431603N, 393213 E)	250m north and side-gradient of Well 5	Petroleum hydrocarbons	Leakage to ground, flow through aquifer	Outside of capture zone for Well 5 and of no concern
16	BC Site ID 2633 Chevron Cardlock	7766 Donaldson Dr. (5432105N, 392775E)	975m north and down-gradient of Well 2, 1200m northwest of Well 5 (side-gradient)	Petroleum hydrocarbons	Leakage to ground, flow through aquifer if reached	Outside of capture zones for Well 2 and Well 5. Of no concern
17	BC Site ID 2639 City Water Well No. 1	2020 Central Ave. (Hwy 3) (5431540N, 393232E)	Source of contamination is 100m northeast	Petroleum hydrocarbons	Leakage to ground, flow through aquifer if reached	Well shut down due to contamination from former fuel stations to northeast
18	BC Site ID 2643 Chevron Station (central)	1863 Central Ave. (Hwy 3) (5431603N, 393213E)	300m northeast of Well 5 (side-gradient)	Petroleum hydrocarbons	Leakage to ground, flow through aquifer	Former fuel UST's. Removed and remediated
19	BC Site ID 7158 Wally's World Shell	1512 Central Ave. (Hwy 3) (5431777N, 393764E)	675m northeast of Well 5 (down-gradient)	Petroleum hydrocarbons	Leakage to ground, flow through aquifer if reached	Currently operating business
20	BC Site ID 7199 Daycare Centre	7348 10th Street and 72 nd Avenue (5431674N, 394331E)	1100m east of Well 5 (down-gradient)	Unknown, suspected underground storage tank	Leakage to ground, flow through aquifer if reached	Outside of capture zone for Well 5 and of no concern

TABLE 4
INITIAL IDENTIFICATION OF POTENTIAL HAZARDS

Hazard Ref. No.	Site Description	Location / Address	Closest City well with distance and location referenced to source (m)	Possible Contaminants of Concern	Contaminant Transport Method	Comments
21	BC Site ID 7773 City Held ROW property	Central Ave and 27th St (5430968N, 392469E)	175m south of Well 2 (side-gradient, 275m northwest of Well 3/3A (side-gradient)	Copper in soil	Leakage to ground, flow through aquifer if reached	Remediated. Area is now where Extra Foods Gas Bar located
22	BC Site ID 2642 Chevron Bulk Plant	7766 Donaldson Dr (5432136N, 392756E)	975m north and down-gradient of Well 2, 1200m northwest of Well 5 (side-gradient)	Petroleum hydrocarbons	Leakage to ground, flow through aquifer if reached	Outside and down-gradient of capture zone for Well 2
23	BC Site ID 2216 Radiator Shop	7436 Donaldson Dr (5431694N, 393255E)	375m north of Well 5 (down-gradient)	Petroleum hydrocarbons	Leakage to ground, flow through aquifer if reached	Outside and down-gradient of capture zone for Well 5
24	BC Site ID 5107 Former PetroCan	179 Central Ave (Hwy 3) (5432218N, 394931E)	1500m east of Well 5 (down-gradient)	Petroleum hydrocarbons	Leakage to ground, flow through aquifer	Outside and down-gradient of capture zone for Well 5
25	BC Site ID 2498 + 8911 Petro Can Bulk Plant	7864 Donaldson Dr (5432262N, 392636E)	975m north and down-gradient of Well 2, 1200m northwest of Well 5 (side-gradient)	Petroleum hydrocarbons	Leakage to ground, flow through aquifer if reached	Engineer and manufacture of electrical control equipment
26	BC Site ID 2601 BC Gr. Forks Gate Station	6149 Como Road (5430576N, 394565E)	1475m southeast of Well 5 (down-gradient)	Unknown	Leakage to ground, flow through aquifer if reached	Down-gradient and hydraulically isolated from City wells due to Kettle River
27	BC Site ID 2218 Marten's PetroCan	331 Central Ave (Hwy 3) (5432190N, 394808E)	1700m northeast of Well 5 (down-gradient)	Hydrocarbons	Leakage to ground, flow through aquifer	Outside and down-gradient of capture zone for Well 5
28	BC Site ID 8139 Emcon Services	6150- 2nd Street (5430601N, 395471E)	2500m east of Well 5 (down-gradient)	Unknown	Leakage to ground, flow through aquifer if reached	Down-gradient and hydraulically isolated from City wells due to Kettle River
29	BC Site ID 8842 PetroCan Station	1611 Central Ave (Hwy 3) (5431778N, 393575E)	500m northeast of Well 5 (down-gradient)	Petroleum hydrocarbons	Leakage to ground, flow through aquifer	Outside and down-gradient of capture zone for Well 5
30	BC Site ID 11010 Roxul Inc.	6526 Industrial Park Way (5431313N, 395485E)	2200m east of Well 5 (down-gradient)	Unknown	Leakage to ground, flow through aquifer if reached	Down-gradient and hydraulically isolated from City wells due to Kettle River
31	BC Site ID 11143 Old Grand Forks Hotel	SE Corner Central Ave and 3 rd Street (on Hwy 3) (5432166N, 394857E)	1750m northeast of Well 5 (down-gradient)	Unknown	Leakage to ground, flow through aquifer if reached	Outside and down-gradient of capture zone for Well 5

TABLE 4
INITIAL IDENTIFICATION OF POTENTIAL HAZARDS

Hazard Ref. No.	Site Description	Location / Address	Closest City well with distance and location referenced to source (m)	Possible Contaminants of Concern	Contaminant Transport Method	Comments
32	BC Site ID 11144 Old Grand Forks Hotel	SE Corner Central Ave and 3rd Street (on Hwy 3) (5432166N, 394857E)	1750m northeast of Well 5 (down-gradient)	Unknown	Leakage to ground, flow through aquifer if reached	Outside and down-gradient of capture zone for Well 5
33	BC Site ID 11331 DA Perley Elementary School Complex	1105 Central Ave (Hwy 3) (5431786N, 394004E)	800m northeast of Well 5 (down-gradient)	Unknown	Leakage to ground, flow through aquifer if reached	Outside and down-gradient of capture zone for Well 5
34	BC Site ID 13599 Fortis BC Substation	South of intersection 68th Ave and 4th Street (5431444N, 395016E)	1700m east of Well 5 (down-gradient)	Unknown	Leakage to ground, flow through aquifer if reached	Down-gradient and hydraulically isolated from City wells due to Kettle River
C. Sites from Windshield Survey						
35	Kal Tire (near Extra Foods)	2690 Central Ave (Hwy 3) (5431123N, 392500E)	185m south of Well 2 (side-gradient), 225m north of Well 3/3A (side-gradient)	Petroleum hydrocarbons, vehicle maintenance chemicals	Leakage to ground, flow through aquifer if reached	Source area is outside and side-gradient from Well 3/3A
36	Super Save Gas Bar	2773 Central Ave (Hwy 3) (5431129N, 392387E)	175m southwest of Well 2 (up-gradient), 350m northwest of Well 3/3A (side-gradient)	Petroleum hydrocarbons	Leakage to ground, flow through aquifer if reached	Source area is outside and side-gradient from Well 3/3A
37	OK Tire	2923 Central Ave (Hwy 3) (5431058N, 392241E)	230m southwest of Well 2 (up-gradient)	Petroleum hydrocarbons, vehicle maintenance chemicals	Leakage to ground, flow through aquifer if reached	Within capture zone of Well 2.
38	ABH Car Sales	2913 Central Ave (Hwy 3) (5431087N, 392288E)	230m southwest of Well 2 (up-gradient)	Petroleum hydrocarbons, vehicle maintenance chemicals	Leakage to ground, flow through aquifer if reached	Within capture zone of Well 2.
39	Recreational Complex	2020 Central Ave (Hwy 3) (5431487N, 393142E)	230m northwest of Well 4/5 (side-gradient)	Coolants, petroleum hydrocarbons	Leakage to ground, flow through aquifer if reached	Source area is outside and side-gradient from Well 4/5
40	Evergreen Cemetery	1468-66th Ave (5431104N, 393799E)	500m southeast of Well 4/5 (down-gradient)	Microbiological pathogens, formaldehyde, arsenic	Leakage to ground, flow through aquifer if reached	Source area is outside and side-gradient from Well 4/5

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TABLE 5
SUMMARY OF BC SITE REGISTRY SEARCH

No.	Site ID	Site Name	Current business / activity	Site Address	UTM N	UTM E	2003 Status	2013 status	Last Update on Registry	Comments
1	2655	Canpar Industries	Plywood Plant	6590 Industrial Park Way	5431436.1	395464.1	AUA	NA	12-Dec-00	south side of river = outside of well capture zones
2	6227	6050 2nd Street	Unifab - steel fabricators	6050 2nd St	5430509.8	395446.7	AUA	NA	17-Nov-00	south side of river = outside of well capture zones
3	2219	Downtown Shell - Food Corner	Unknown business at NE corner 3rd St and Central Ave	272 Central Ave	5432189.1	394848.7	AUR	IRC	26-Sep-08	> 1 km east (outside) of capture zones for Well 4/5
4	2487	Former Texaco (Central)	Vacant, SE corner of Central Ave and 19th St	1866 Central Ave	5431602.6	393212.6	AUR	AUR	22-Feb-13	100m north (outside) of capture zone for Well 4/5
5	2633	Chevron Cardlock	Vacant and fenced on east side of road	7766 Donaldson Dr	5432105.2	392775.4	AUR	AUR	1-Jun-06	south part of fenced yard, 900m north (outside) of capture zone for Well 4/5
6	2639	Grand Forks Well Contamination - PW1	In parking lot to east of community arena	2020 Central Ave	5431540.4	393231.7	AUR	NA	4-Apr-05	100m north (outside) of capture zone for Well 4/5
7	2643	Chevron Station (Central)	Vacant, NE corner of Central Ave and 19th St	1863 Central Ave	5431602.6	393212.6	AUR	AUA	22-Feb-13	100m north (outside) of capture zone for Well 4/5
8	7158	Wally's World Shell Service Station	SE corner of Boundary and Central Avenue	1512 Central Ave	5431777.3	393764.4	AUR	NA	20-Apr-01	still operational, 375m east (outside) of capture zone for Well 4/5
9	7199	7348 10th Street	Daycare at corner of 10th and 72nd Ave	7348 10th Ave	5431673.8	394331.1	AUR	NA	21-Nov-03	south side of river = outside of well capture zones
10	7773	City of Grand Forks Property	Site west of Extra Foods and south of highway	Central Ave and 27th St	5430968.2	392469.0	AUR	INFA	16-Oct-03	former rail line ROW, remediated by the City, within capture zone of Well 3/3A
11	126	Sumac Ventures Heap Leach Site	Along Grandby River, 50 km north of Grand Forks	Union Mine Road	5489790.0	402014.8	INFA	NA	unknown	not on 2013 query of Site Registry, not close to City
12	2642	Chevron Bulk Plant	Vacant and fenced on east side of road	7778 Donaldson Dr	5432136.5	392755.7	INFA	INFA	17-Nov-00	north part of fenced yard, 900m north (outside) of capture zone for Well 4/5
13	2216	Former RBT Enterprise	Radiator Shop behind motel	7436 Donaldson Dr	5431694.4	393255.0	INFA	INFA	25-Apr-02	outside of capture zones
14	5107	Former Petro-Can	Vacant lot NE corner of Central Ave and 2nd St	179 Central Ave	5432218.4	394930.5	INFA	INFA	31-Jan-02	1500m east (outside) of capture zone for Well 4/5
15	2498	Petro Canada Bulk Plant	East side of road	7864 Donaldson Dr	5432262.4	392636.3	INFA	INFA	3-Nov-03	still operated as a card lock, 750m north (outside) of capture zone for Well 2
16	2601	Grand Forks Gate Station - BC Gas	Transmission pumping station	6149 Como Road.	5430576.0	394565.0	IRC	INFA	7-Mar-03	south east of river = outside of well capture zones
17	2218	Former Marten's Petro-Can	Intersection of Central Ave & 3rd Street	331 Central Ave	5432189.8	394808.1	IRC	INFA	3-May-01	1.7 km east (outside) of capture zone for Well 4/5
18	8139	Emcon Services	Industrial	6150 2nd Street	5430601.0	395471.0	NA	NA	3-Nov-03	south side of river = outside of well capture zones
19	8842	Petrocan station	NW corner of Central Ave and 16th Street	1611 Central Ave	5431778.0	393575.0	NA	AUR	23-Oct-09	230m northeast (outside) of capture zone for Well 4/5
20	8911	Petrocan Bulk Plant	Still operational bulk plant	7870 Donaldson Dr	5432262.4	392636.3	NA	IRC	27-Apr-09	probably associated with Site ID 2498. >750m north (outside) of capture zone for Well 2
21	9191	Unknown	Unknown	Unknown	NA	NA	NA	INFA	12-Jun-06	unknown, since inactive did not pursue further details
22	11010	Roxul Inc.	Industrial	6526 Industrial Way	5431313.0	395485.0	NA	unknown	unknown	south side of river = outside of well capture zones
23	11143	South Management Area	Former site of Old Grand Forks Hotel	SE corner of Central Ave and 3rd Street	5432166.0	394857.0	NA	IRC	19-Jan-09	Old Grand Forks Hotel Site, 1.4 km east (outside) of capture zone for Well 4/5
24	11144	Northern Area	Former site of Old Grand Forks Hotel	SE corner of Central Ave and 3rd Street	5432166.0	394857.0	NA	IRC	19-Jan-09	Old Grand Forks Hotel Site, 1.4 km east (outside) of capture zone for Well 4/5
25	11331	D.A Perley Elementary School	Institutional	805 and 1155 Central Ave	5431786.0	394004.0	NA	unknown	unknown	300m northeast (outside) of capture zone for Well 4/5
26	13599	Fortis BC substation yard	Substation	south of intersection 68th Ave and 4th Street	5431444.0	395016.0	NA	NA	22-Dec-11	south side of river = outside of well capture zones

Notes:

- Status in 2003 based on data provided by MWLAP, Thompson & Okanagan Regions, January 2003. Data for 2013 accessed online 24 Feb 2013.
- Status Definition:
INFA Inactive - No Further Action AUR Active - Under Remediation
IRC Inactive - Remediation Complete AUA Active - Under Assessment
- Latitude, longitude and/or UTM coordinates are generally provided by third party (non-government) sources and accuracy is not guaranteed.

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TABLE 6
SUMMARY OF POTENTIAL HAZARDS TO SOURCE WATER QUALITY

Hazard Ref. No.	Site Description (from Table 4)	Identified or Potential Drinking Water Hazard	Possible Effects	Existing Preventative Measures	Associated Barrier(s)
1	Agricultural activities	Nitrates, nitrite, ammonia, pesticides, herbicides, sodium, chloride phosphate	Dissolved contaminants in groundwater	Unknown or best management practices	At extreme limits of capture zones for Well 2 and Well 3/3A. Public education to reinforce BMPs for use of agricultural chemicals. Ongoing water quality monitoring.
2	Major transportation corridors	Salt, petroleum hydrocarbons, accidental spills, fire retardants	Dissolved contaminants in groundwater, soil contamination	Speed control zones, spill response by police, fire crews and HAZMAT	> 300m from Well 2 (up-gradient) and Well 3/3A (side-gradient). Ongoing water quality monitoring.
3	Urban runoff	Petroleum hydrocarbons, chloride,	Reduced quality of groundwater recharge	Limit recharge to ground <50m from wells	BC Urban Runoff Quality Control Guidelines, BC Stormwater Management Planning Guidebook.
4	Above Ground Storage Tanks (ASTs)	Petroleum hydrocarbons	Soil / groundwater contamination	Unknown or best management practices	400m up-gradient of Well 3/3A, limited potential number of tanks expected. Outreach to encourage building of spill pads and cleanup of spills.
5	Wastewater lines (buried sewer mains near wells)	Microbiological pathogens, nutrients	Dissolved contaminants in groundwater	Unknown. Regular pipeline integrity monitoring	Natural attenuation is limited but is provided by vertical migration in the unsaturated zone and via lateral migration through aquifer. Ongoing water quality monitoring.
6	Surface water interaction	Microbiological pathogens	Soil / groundwater contamination	Unknown or best management practices	Distances between river and wells are substantial and meet GWUDI guidelines.
7	Storm water lines and drainage swales	Microbiological pathogens, nutrients, chloride, common house and commercial chemicals	Short-circuiting of surface contaminants to the aquifer	Best Management Practices and public education regarding storage, use and disposal of chemicals	Regular integrity monitoring of storm pipes.
8	Individual lot on-site wastewater disposal	Microbiological pathogens (E.Coli), nutrients	Groundwater contamination	Unknown or best management practices	City Bylaws for subdivision / OCP zoning.
9	Community wastewater disposal (trailer and modular home parks)	Microbiological pathogens (E.Coli), nutrients	Groundwater contamination	Unknown or best management practices	City Bylaws for subdivision / OCP zoning.
10	Industrial wastewater disposal	Microbiological pathogens (E.Coli), nutrients	Dissolved and biological contaminants in groundwater	Unknown or best management practices	No industrial and only limited commercial activity in close proximity to capture zones. Encourage BMPs.
11	Industrial chemicals and waste handling / storage	Microbiological pathogens, petroleum hydrocarbons, solvents	Dissolved contaminants in groundwater	Unknown or best management practices	Possible new BMPs for businesses along highway and close to capture zones.
12	BC Site ID 2655 Canpar Plywood Plant	Waste oils, solvents, wood preservatives	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs.

TABLE 6
SUMMARY OF POTENTIAL HAZARDS TO SOURCE WATER QUALITY

Hazard Ref. No.	Site Description (from Table 4)	Identified or Potential Drinking Water Hazard	Possible Effects	Existing Preventative Measures	Associated Barrier(s)
13	BC Site ID 6227 Unifab Steel Fabricators	Unknown	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs.
14	BC Site ID 2219 Shell Food Corner	Petroleum hydrocarbons	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs. Likely still monitored by private company using monitoring wells.
15	BC Site ID 2487 Former Texaco Central	Petroleum hydrocarbons	Soil / groundwater contamination	N/A	Outside of capture zones-gradient of wells. Vacant lot has been remediated. Still monitored by private company.
16	BC Site ID 2633 Chevron Cardlock	Petroleum hydrocarbons	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs. Likely still monitored by private company using monitoring wells.
17	BC Site ID 2639 City Water Well No. 1	Petroleum hydrocarbons	Soil / groundwater contamination	N/A	Well is no longer used and not monitored. Nearby source has been remediated. GWPR requires closure of this well after 5 years of non-use.
18	BC Site ID 2643 Chevron Station (central)	Petroleum hydrocarbons	Soil / groundwater contamination	N/A	Outside of capture zones-gradient of wells. Vacant lot has been remediated. Still monitored by private company.
19	BC Site ID 7158 Wally's World Shell	Petroleum hydrocarbons	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs. Likely still monitored by private company using monitoring wells.
20	BC Site ID 7199 Daycare Centre	Unknown, suspect petroleum hydrocarbons	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs.
21	BC Site ID 7773 City-Held ROW property	Copper impacted soils	Soil contamination	N/A	Has been remediated.
22	BC Site ID 2642 Chevron Bulk Plant	Petroleum hydrocarbons	Soil / groundwater contamination	N/A	Empty lot has been remediated and is down-gradient. Likely still monitored by private company using monitoring wells.
23	BC Site ID 2216 Radiator Shop	Petroleum hydrocarbons, coolants, solvents	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs.
24	BC Site ID 5107 Former PetroCan	Petroleum hydrocarbons	Soil / groundwater contamination	N/A	Empty lot has been remediated and is down-gradient. Likely still monitored by private company using monitoring wells.

TABLE 6
SUMMARY OF POTENTIAL HAZARDS TO SOURCE WATER QUALITY

Hazard Ref. No.	Site Description (from Table 4)	Identified or Potential Drinking Water Hazard	Possible Effects	Existing Preventative Measures	Associated Barrier(s)
25	BC Site ID 2498 + ID 8911 Petro Can Bulk	Petroleum hydrocarbons	Groundwater contamination	N/A	Empty lot has been remediated and is down-gradient. Likely still monitored by private company using monitoring wells.
26	BC Site ID 2601 BC Gr. Forks Gate Station	Unknown	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs.
27	BC Site ID 2218 Marten's PetroCan	Petroleum hydrocarbons	Groundwater contamination	N/A	Site has been remediated and is down-gradient. Likely still monitored by private company using monitoring wells.
28	BC Site ID 8139 Emcon Services	Unknown, suspect petroleum hydrocarbons	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs.
29	BC Site ID 8842 PetroCan Station	Petroleum hydrocarbons	Groundwater contamination	Unknown or best management practices	Still active station. Down-gradient of wells. Likely still monitored by private company using monitoring wells.
30	BC Site ID 11010 Roxul Inc.	Unknown	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs.
31	BC Site ID 11143 Old Grand Forks Hotel	Unknown	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs.
32	BC Site ID 11144 Old Grand Forks Hotel	Unknown	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs.
33	BC Site ID 11331 DA Perley Elementary School	Unknown	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs.
34	BC Site ID 13599 Fortis BC Substation	Unknown	Soil / groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs.
35	Kal Tire (near Extra Foods)	Petroleum hydrocarbons, vehicle maintenance chemicals	Dissolved contaminants in groundwater, soil contamination	Unknown or best management practices	Source is not within any capture zone for City well.
36	Super Save Gas Bar	Petroleum hydrocarbons	Dissolved contaminants in groundwater, soil contamination	Unknown or best management practices	Source is 175m away from Well 2. Ongoing water quality monitoring.

TABLE 6
SUMMARY OF POTENTIAL HAZARDS TO SOURCE WATER QUALITY

Hazard Ref. No.	Site Description (from Table 4)	Identified or Potential Drinking Water Hazard	Possible Effects	Existing Preventative Measures	Associated Barrier(s)
37	OK Tire	Petroleum hydrocarbons, vehicle maintenance chemicals	Dissolved contaminants in groundwater, soil contamination	Unknown or best management practices	Source is 230m away from Well 2. Ongoing water quality monitoring.
38	ABH Car Sales	Petroleum hydrocarbons, vehicle maintenance chemicals	Dissolved contaminants in groundwater, soil contamination	Unknown or best management practices	Source is 230m away from Well 2. Ongoing water quality monitoring.
39	Recreational Complex	Coolants, petroleum hydrocarbons	Groundwater contamination	Unknown or best management practices	Side-gradient of Well 5 and outside of capture zone. Encourage BMPs.
40	Evergreen Cemetery	Microbiological pathogens, formaldehyde, pesticides, fertilizers	Groundwater contamination	Unknown or best management practices	Down-gradient of wells. Encourage BMPs.
41	Existing City Wells	Microbiological pathogens (E.Coli), nutrients	Well casing failure/collapse due to corrosion. Well acts as conduit to deeper part of aquifer resulting in contamination	Regular well maintenance and video inspection to detect casing integrity	None
42	Other wells	Microbiological pathogens (E.Coli), nutrients	Well casing failure/collapse due to corrosion. Well acts as conduit to deeper part of aquifer resulting in contamination	GWPR requires deactivation or closing of abandoned or unused wells after 5 years	Government enforcement of requirement for deactivation and closure of wells
43	Future Development	General land use hazard due to development or re-development of an area within capture zones	Groundwater contamination	Unknown or best management practices	Development, zoning and subdivision bylaws, Official Community Plan, cross jurisdictional land use with RDKB. Collaborate with other water utilities.
44	Suds	dry cleaning chemicals including perchloroethylene (PERC), trichlorethylene (TCE) and breakdown products	Groundwater contamination	Use of tetrachloroethylene and handling/disposal of waste is regulated under the Canadian Env. Protection Act and the Tetrachloroethylene Regulation	Down-gradient of wells. Encourage BMPs.

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TABLE 11
SUMMARY OF RISK CHARACTERIZATION ANALYSIS

Hazard Ref. No.	Site Description (from Table 4)	Identified or Potential Drinking Water Hazard	Possible Effects	Existing Preventative Measures	Likelihood Level (Table 7)	Consequence Level (Table 8)	Assigned Risk Level (Table 9)	Associated Barrier(s)
Group 1 – Point and Non-Point Sources within Capture Zones								
1	Agricultural activities	Nitrates, nitrite, ammonia, pesticides, herbicides, sodium, chloride phosphate	Dissolved contaminants in groundwater	Unknown or best management practices	C	2	Moderate	At extreme limits of capture zones for Well 2 and Well 3/3A. Public education to reinforce BMPs for use of agricultural chemicals. Ongoing water quality monitoring.
2	Major transportation corridors	Salt, petroleum hydrocarbons, accidental spills, fire retardants	Dissolved contaminants in groundwater, soil contamination	Speed control zones, spill response by police, fire crews and HAZMAT	D	3	Moderate	> 300m from Well 2 (up-gradient) and Well 3/3A (side-gradient). Ongoing water quality monitoring.
5	Wastewater lines (buried sewer mains near wells)	Microbiological pathogens, nutrients	Dissolved contaminants in groundwater	Unknown. Regular pipeline integrity monitoring	D	4	High	Natural attenuation is limited but is provided by vertical migration in the unsaturated zone and via lateral migration through aquifer. Ongoing water quality monitoring.
36	Super Save Gas Bar	Petroleum hydrocarbons	Dissolved contaminants in groundwater, soil contamination	Unknown or best management practices	E	3	Moderate	Source is 175m away from Well 2. Ongoing water quality monitoring.
37	OK Tire	Petroleum hydrocarbons, vehicle maintenance chemicals	Dissolved contaminants in groundwater, soil contamination	Unknown or best management practices	E	3	Moderate	Source is 230m away from Well 2. Ongoing water quality monitoring.
38	ABH Car Sales	Petroleum hydrocarbons, vehicle maintenance chemicals	Dissolved contaminants in groundwater, soil contamination	Unknown or best management practices	E	3	Moderate	Source is 230m away from Well 2. Ongoing water quality monitoring.
41	Existing City Wells	Microbiological pathogens (E.Coli), nutrients	Well casing failure/collapse due to corrosion. Wells are conduit from surface to the deeper part of aquifer	Regular well maintenance and video inspection to detect casing integrity	D	3	Moderate	None
42	Other wells	Microbiological pathogens (E.Coli), nutrients	Well casing failure/collapse due to corrosion. Well acts as conduit to deeper part of aquifer resulting in contamination	GWPR requires deactivation or closing of abandoned or unused wells after 5 years	D	3	Moderate	Government enforcement of requirement for deactivation and closure of wells

TABLE 11
SUMMARY OF RISK CHARACTERIZATION ANALYSIS

Hazard Ref. No.	Site Description (from Table 4)	Identified or Potential Drinking Water Hazard	Possible Effects	Existing Preventative Measures	Likelihood Level (Table 7)	Consequence Level (Table 8)	Assigned Risk Level (Table 9)	Associated Barrier(s)
Group 2 – Point and Non-Point Sources Outside Capture Zones and Not Up-gradient								
1	Agricultural field	Nitrates, fertilizers, pesticides	Dissolved contaminants in groundwater	Unknown or best management practices	D	2	Low	Public education to reinforce BMPs for use of chemicals.
35	Kal Tire (near Extra Foods)	Petroleum hydrocarbons, vehicle maintenance chemicals	Dissolved contaminants in groundwater, soil contamination	Unknown or best management practices	E	1	Low	Source is not within any capture zone for City well.
Group 3 – Point and Non-Point Sources Outside Capture Zones and at Considerable Distance (>0.5 km)								
4	Above Ground Storage Tanks (ASTs)	Petroleum hydrocarbons	Soil / groundwater contamination	Unknown or best management practices	E	1	Low	400 m up-gradient of Well 3/3A, limited potential number of tanks expected. Outreach to encourage building of spill pads and cleanup of spills.
6	Surface water interaction	Microbiological pathogens	Soil / groundwater contamination	Unknown or best management practices	E	2	Low	Distances between river and wells are substantial and meet GWUDI guidelines.
10	Industrial wastewater disposal	Microbiological pathogens (E.Coli), nutrients	Dissolved and biological contaminants in groundwater	Unknown or best management practices	D	2	Low	No industrial and only limited commercial activity in close proximity to capture zones. Encourage BMPs.
11	Industrial chemicals and waste handling / storage	Microbiological pathogens, petroleum hydrocarbons, solvents	Dissolved contaminants in groundwater	Unknown or best management practices	D	2	Low	Possible new BMPs for businesses along highway and close to capture zones.
12	BC Site ID 2655 Canpar Plywood Plant	Waste oils, solvents, wood preservatives	Soil / groundwater contamination	Unknown or best management practices	D	2	Low	Down-gradient of wells. Encourage BMPs.
13	BC Site ID 6227 Unifab Steel Fabricators	Unknown	Soil / groundwater contamination	Unknown or best management practices	D	1	Low	Down-gradient of wells. Encourage BMPs.
14	BC Site ID 2219 Shell Food Corner	Petroleum hydrocarbons	Soil / groundwater contamination	Unknown or best management practices	C	1	Low	Down-gradient of wells. Encourage BMPs. Likely still monitored by private company using monitoring wells.
15	BC Site ID 2487 Former Texaco Central	Petroleum hydrocarbons	Soil / groundwater contamination	N/A	C	1	Low	Outside of capture zones-gradient of wells. Vacant lot has been remediated. Still monitored by private company.

TABLE 11
SUMMARY OF RISK CHARACTERIZATION ANALYSIS

Hazard Ref. No.	Site Description (from Table 4)	Identified or Potential Drinking Water Hazard	Possible Effects	Existing Preventative Measures	Likelihood Level (Table 7)	Consequence Level (Table 8)	Assigned Risk Level (Table 9)	Associated Barrier(s)
16	BC Site ID 2633 Chevron Cardlock	Petroleum hydrocarbons	Soil / groundwater contamination	Unknown or best management practices	C	1	Low	Down-gradient of wells. Encourage BMPs. Likely still monitored by private company using monitoring wells.
19	BC Site ID 7158 Wally's World Shell	Petroleum hydrocarbons	Soil / groundwater contamination	Unknown or best management practices	C	1	Low	Down-gradient of wells. Encourage BMPs. Likely still monitored by private company using monitoring wells.
22	BC Site ID 2642 Chevron Bulk Plant	Petroleum hydrocarbons	Soil / groundwater contamination	N/A	C	1	Low	Empty lot has been remediated and is down-gradient. Likely still monitored by private company using monitoring wells.
23	BC Site ID 2216 Radiator Shop	Petroleum hydrocarbons, coolants, solvents	Soil / groundwater contamination	Unknown or best management practices	C	1	Low	Down-gradient of wells. Encourage BMPs.
24	BC Site ID 5107 Former PetroCan	Petroleum hydrocarbons	Soil / groundwater contamination	N/A	C	1	Low	Empty lot has been remediated and is down-gradient. Likely still monitored by private company using monitoring wells.
25	BC Site ID 2498 + ID 8911 PetroCan Bulk	Petroleum hydrocarbons	Groundwater contamination	N/A	C	1	Low	Empty lot has been remediated and is down-gradient. Likely still monitored by private company using monitoring wells.
29	BC Site ID 8842 PetroCan Station	Petroleum hydrocarbons	Groundwater contamination	Unknown or best management practices	C	1	Low	Still active station. Down-gradient of wells. Likely still monitored by private company using monitoring wells.
33	BC Site ID 11331 DA Perley Elementary School	Unknown	Soil / groundwater contamination	Unknown or best management practices	D	1	Low	Down-gradient of wells. Encourage BMPs.

TABLE 11
SUMMARY OF RISK CHARACTERIZATION ANALYSIS

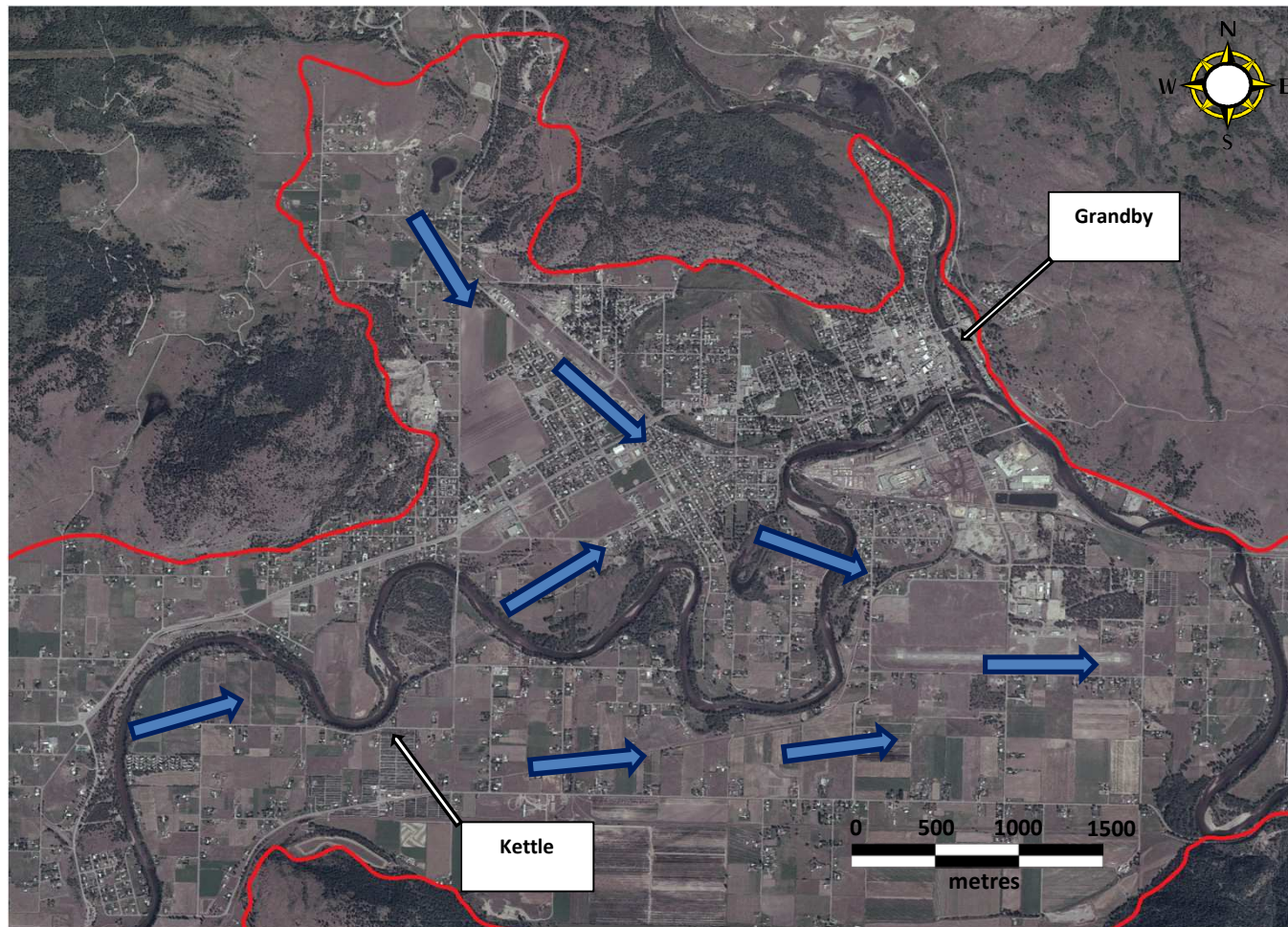
Hazard Ref. No.	Site Description (from Table 4)	Identified or Potential Drinking Water Hazard	Possible Effects	Existing Preventative Measures	Likelihood Level (Table 7)	Consequence Level (Table 8)	Assigned Risk Level (Table 9)	Associated Barrier(s)
Group 4 – Stand Alone Hazards								
3	Urban runoff	Petroleum hydrocarbons, chloride	Reduced quality of groundwater recharge	Limit recharge to ground <50m from wells	D	2	Low	BC Urban Runoff Quality Control Guidelines, BC Stormwater Management Planning Guidebook.
7	Storm water lines and drainage swales	Microbiological pathogens, nutrients, chloride, common house and commercial chemicals	Short-circuiting of surface contaminants to the aquifer	Best Management Practices and public education regarding storage, use and disposal of chemicals	D	2	Low	Regular integrity monitoring of storm pipes.
8	Individual lot on-site wastewater disposal	Microbiological pathogens (E.Coli), nutrients	Groundwater contamination	Unknown or best management practices	D	1	Low	City Bylaws for subdivision / OCP zoning.
9	Community wastewater disposal (trailer & modular parks)	Microbiological pathogens (E.Coli), nutrients	Groundwater contamination	Unknown or best management practices	C	2	Moderate	City Bylaws for subdivision / OCP zoning.
17	BC Site ID 2639 City Water Well No. 1	Petroleum hydrocarbons	Soil / groundwater contamination	N/A	C	2	Moderate	Well is no longer used and not monitored. Nearby source has been remediated. GWPR requires closure of this well after 5 years of non-
18	BC Site ID 2643 Chevron Station (central)	Petroleum hydrocarbons	Soil / groundwater contamination	N/A	C	1	Low	Outside of capture zones-gradient of wells. Vacant lot has been remediated. Still monitored by private company.
20	BC Site ID 7199 Daycare Centre	Unknown, suspect petroleum hydrocarbons	Soil / groundwater contamination	Unknown or best management practices	E	1	Low	Down-gradient of wells. Encourage BMPs.
21	BC Site ID 7773 City Held ROW property	Copper impacted soils	Soil contamination	N/A	C	1	Low	Has been remediated.
26	BC Site ID 2601 BC Gr. Forks Gate Station	Unknown	Soil / groundwater contamination	Unknown or best management practices	E	1	Low	Down-gradient of wells. Encourage BMPs.
27	BC Site ID 2218 Marten's PetroCan	Petroleum hydrocarbons	Groundwater contamination	N/A	C	1	Low	Site has been remediated and is down-gradient. Likely still monitored by private company using monitoring wells.
28	BC Site ID 8139 Emcon Services	Unknown, suspect hydrocarbons	Soil / groundwater contamination	Unknown or best management practices	D	1	Low	Down-gradient of wells. Encourage BMPs.

TABLE 11
SUMMARY OF RISK CHARACTERIZATION ANALYSIS



Hazard Ref. No.	Site Description (from Table 4)	Identified or Potential Drinking Water Hazard	Possible Effects	Existing Preventative Measures	Likelihood Level (Table 7)	Consequence Level (Table 8)	Assigned Risk Level (Table 9)	Associated Barrier(s)
30	BC Site ID 11010 Roxul Inc.	Unknown	Soil / groundwater contamination	Unknown or best management practices	C	1	Low	Down-gradient of wells. Encourage BMPs.
31	BC Site ID 11143 Old Grand Forks Hotel	Unknown	Soil / groundwater contamination	Unknown or best management practices	D	1	Low	Down-gradient of wells. Encourage BMPs.
32	BC Site ID 11144 Old Grand Forks Hotel	Unknown	Soil / groundwater contamination	Unknown or best management practices	D	1	Low	Down-gradient of wells. Encourage BMPs.
34	BC Site ID 13599 Fortis BC Substation	Unknown	Soil / groundwater contamination	Unknown or best management practices	E	1	Low	Down-gradient of wells. Encourage BMPs.
39	Recreational Complex	Coolants, petroleum hydrocarbons	Groundwater contamination	Unknown or best management practices	E	2	Low	Side-gradient of Well 5 and outside of capture zone. Encourage BMPs.
40	Evergreen Cemetery	Microbiological pathogens, formaldehyde, pesticides, fertilizers	Groundwater contamination	Unknown or best management practices	E	1	Low	Down-gradient of wells. Encourage BMPs.
43	Future Development	General land use hazard due to development or re-development within capture zones	Groundwater contamination	Unknown or best management practices	D	3	Moderate	Development, zoning and subdivision bylaws, Official Community Plan, cross jurisdictional land use with RDKB. Collaborate with other water utilities.
44	Suds Laundromat and Dry Cleaning (1460 Central Avenue)	Tetrachloroethene (perchloroethene, or PCE), and Trichloroethene (TCE) and dichloroethene	Groundwater contamination	Canadian Environmental Protection Act and the Tetrachloroethylene Regulation	E	1	Low	Down-gradient of all City Wells. Encourage BMPs

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FIGURES



Legend

-  Direction of Flow
-  Limits of Aquifer

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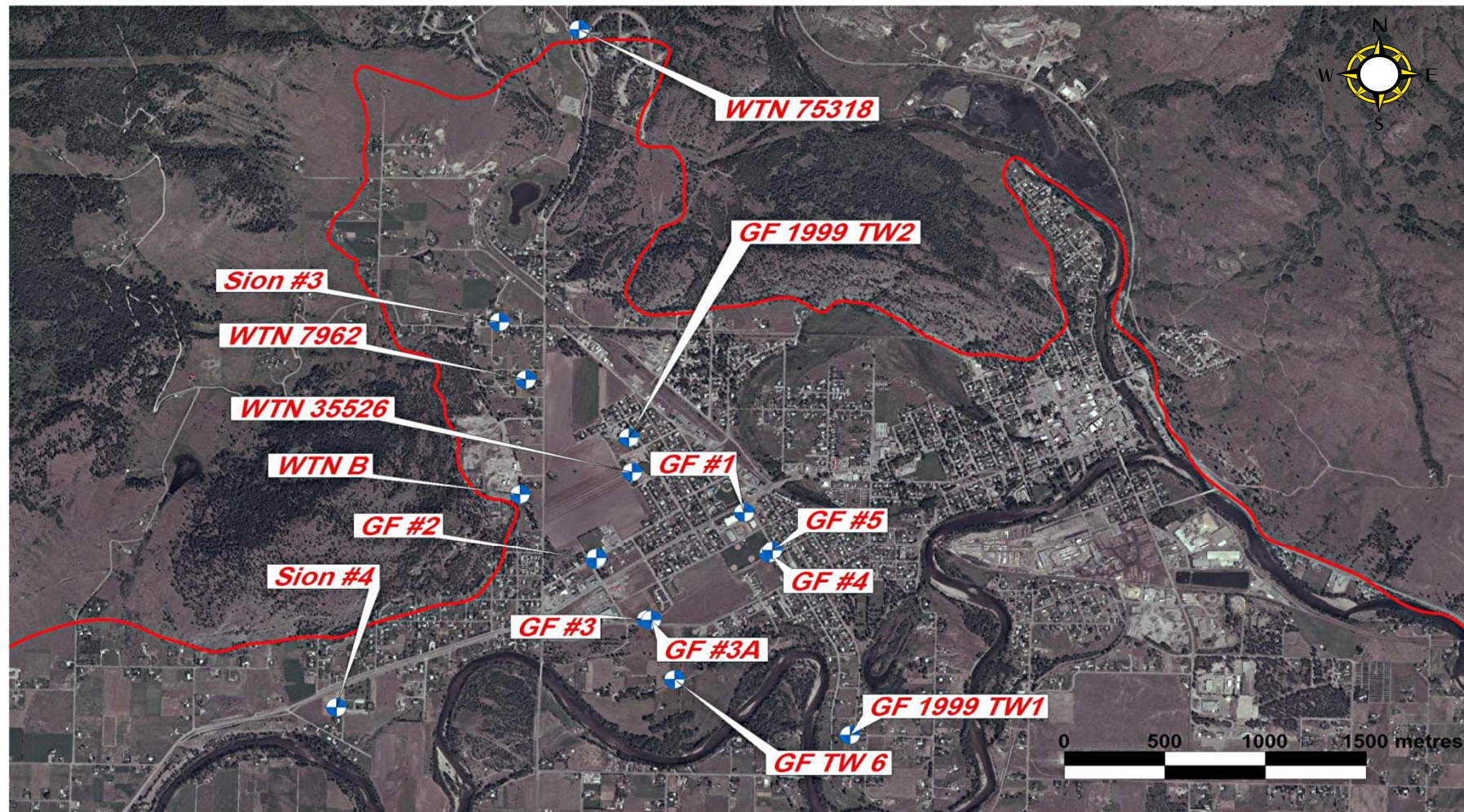
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PLAN OF STUDY AREA

BY: RA	DATE: JUNE 13
APPROVED: RA	FIG: 1



Legend

Blue dot denotes well location

Red label denotes well name

CITY OF GRAND FORKS WELL AND AQUIFER PROTECTION PLAN

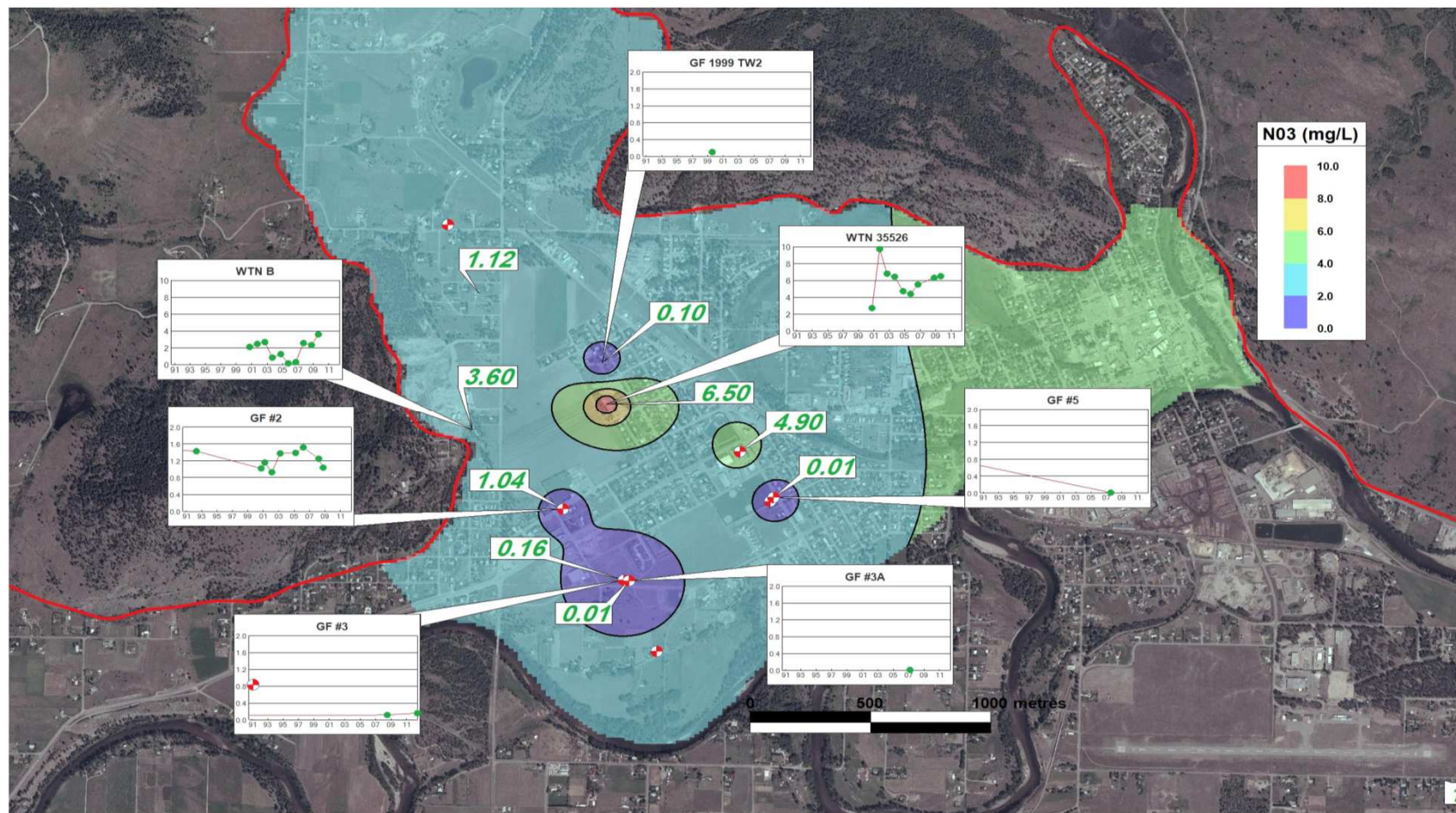
WELL LOCATIONS

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BY: RA	DATE: JUNE 13
APPROVED: RA	FIG: 2



Green numbers represent maximum historical nitrate concentration in mg/l

CITY OF GRAND FORKS WELL AND AQUIFER PROTECTION PLAN

SPATIAL AND TEMPORAL PLOT FOR NITRATES

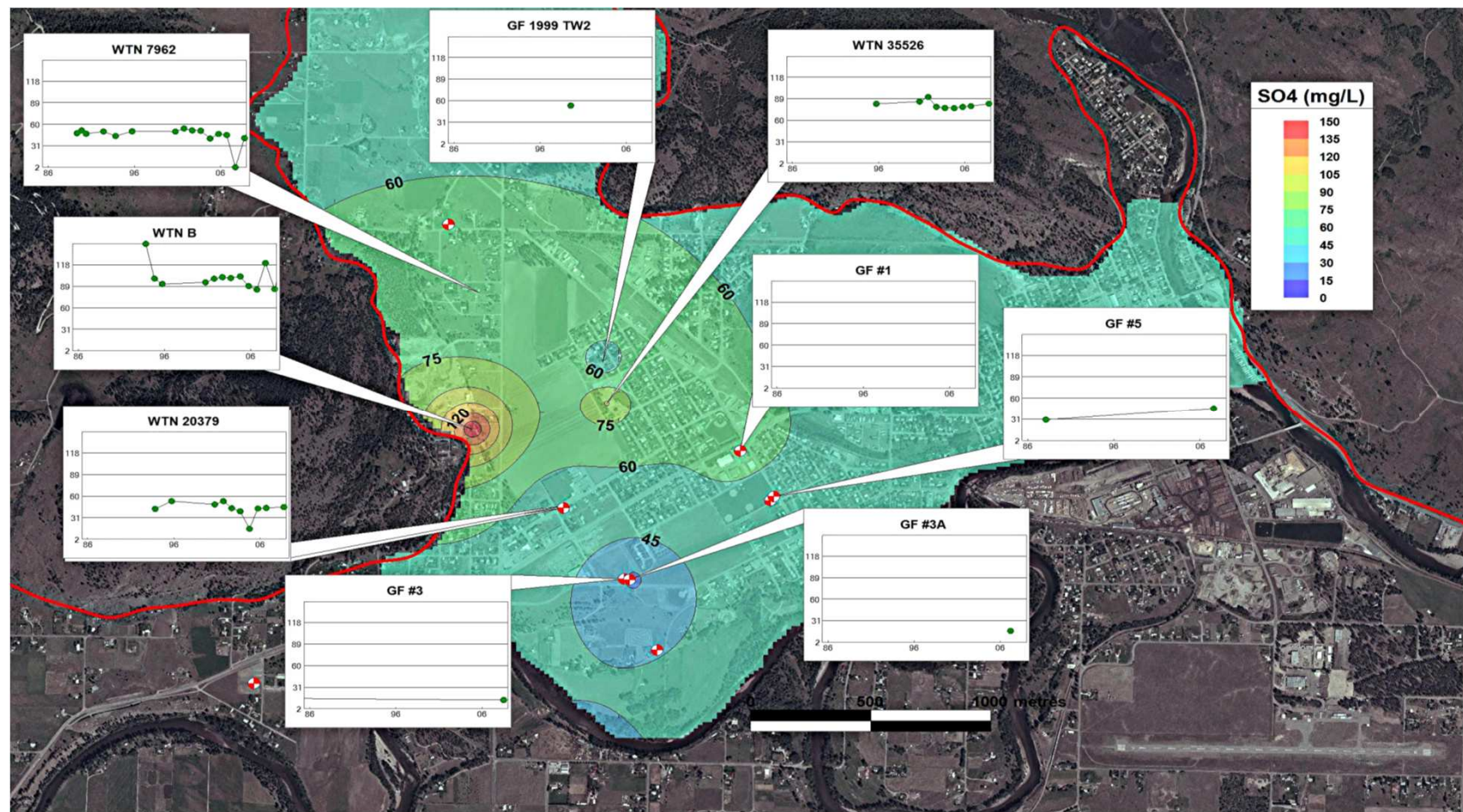
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BY:
RA
APPROVED:
RA

DATE:
JUNE 13
FIG:
3



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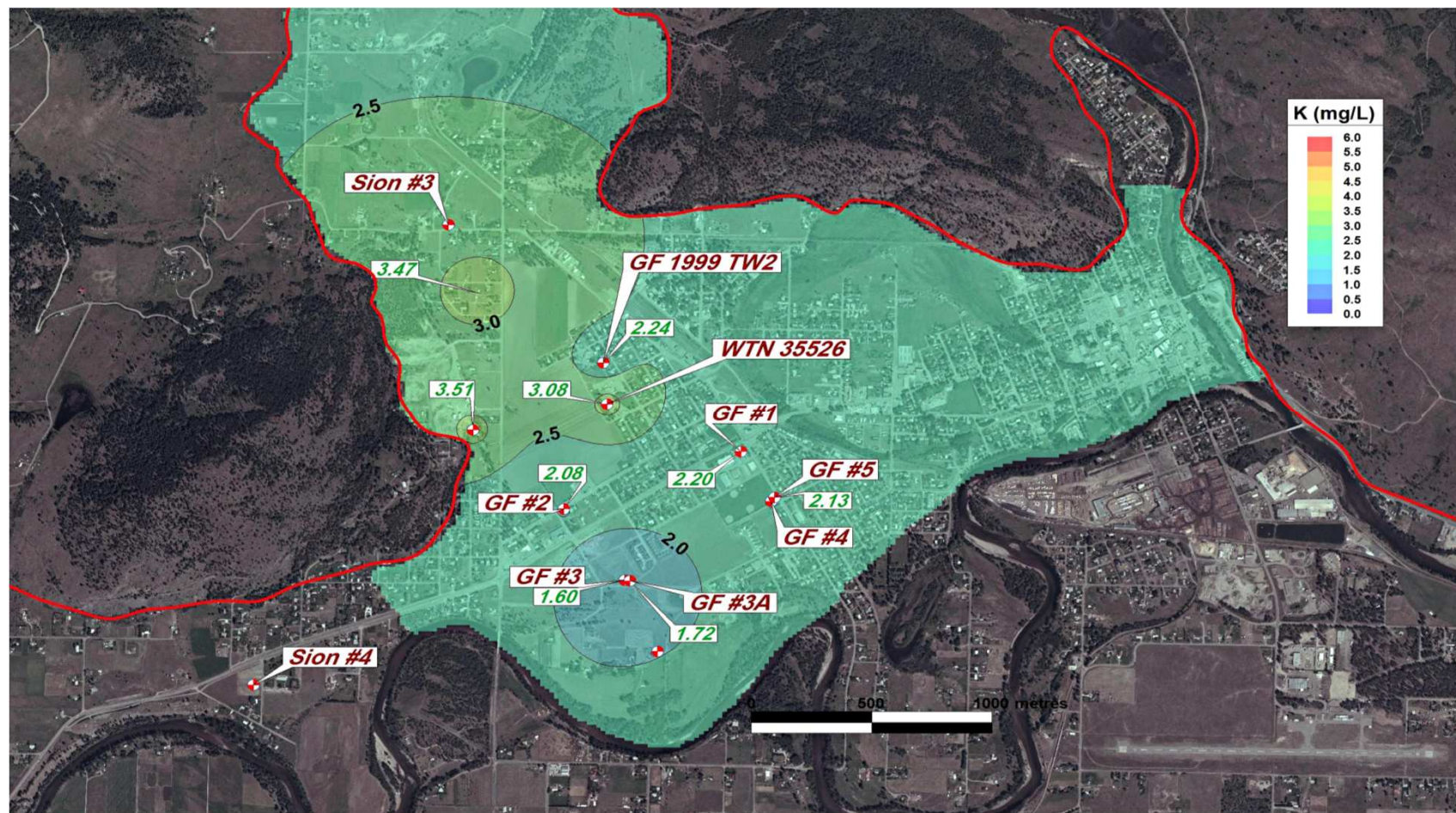
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SPATIAL AND TEMPORAL PLOT FOR SULPHATES

BY: RA	DATE: JUNE 13
APPROVED: RA	FIG: 4



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CITY OF GRAND FORKS WELL AND AQUIFER PROTECTION PLAN

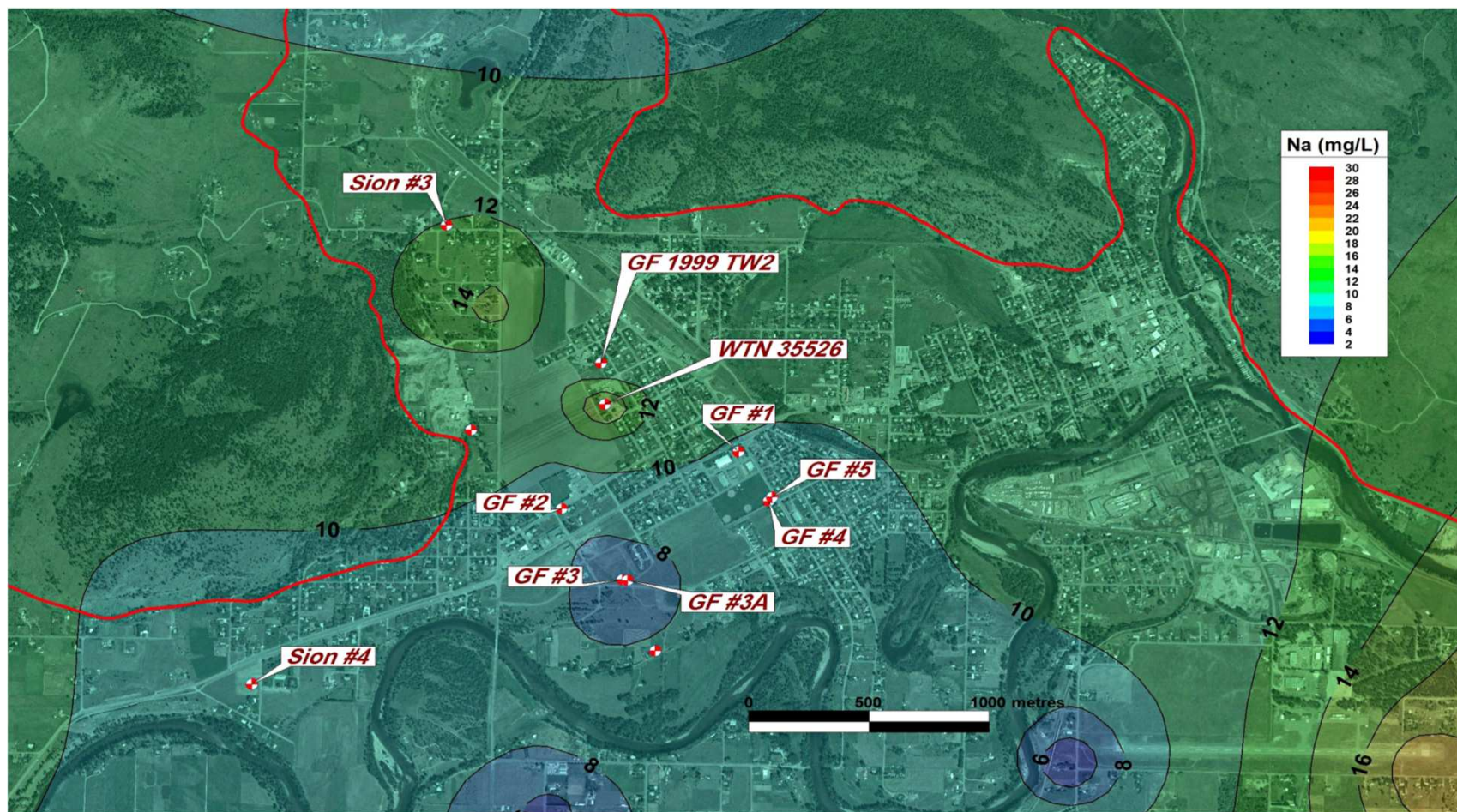


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SPATIAL AND TEMPORAL PLOT FOR POTASSIUM

BY:
RA
APPROVED:
RA

DATE:
JUNE 13
FIG:
5



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CITY OF GRAND FORKS WELL AND AQUIFER PROTECTION PLAN



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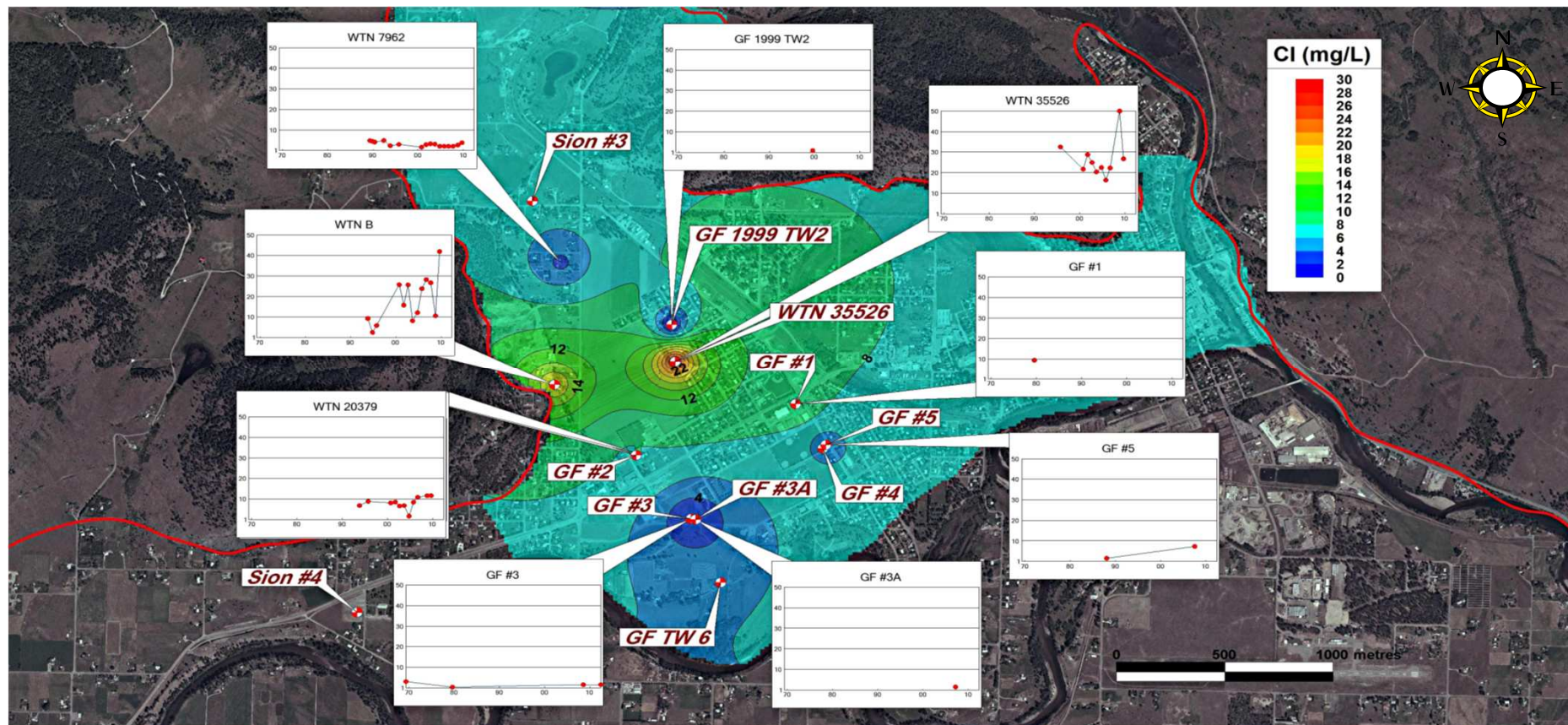
SPATIAL AND TEMPORAL PLOT FOR SODIUM

BY:
RA

DATE:
JUNE 13

APPROVED:
RA

FIG:
6



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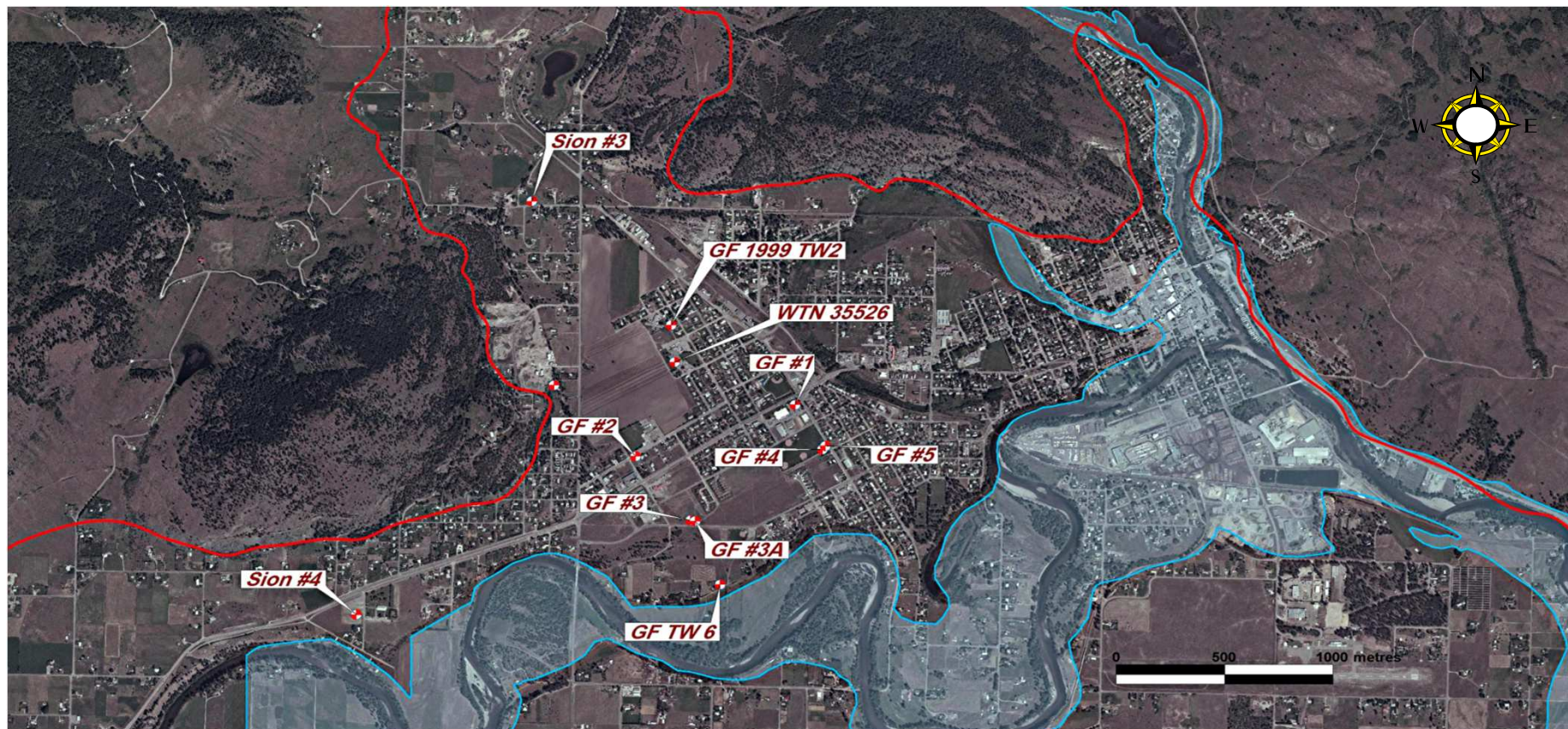
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SPATIAL AND TEMPORAL PLOT FOR CHLORIDE

BY:	RA	DATE:	JUNE 13
APPROVED:	RA	FIG:	7



Legend

blue is extent of floodplain

Floodplain limits provided by Urban Systems Ltd.

CITY OF GRAND FORKS WELL AND AQUIFER PROTECTION PLAN

WELL LOCATIONS IN RELATION TO EXTENT OF FLOODPLAIN

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BY:	RA	DATE:	JUNE 13
APPROVED:	RA	FIG:	8



Capture Zones determined using Modflow model developed by Dr. D. Allen at Simon Fraser University (Allen, 2004)

CITY OF GRAND FORKS WELL AND AQUIFER PROTECTION PLAN

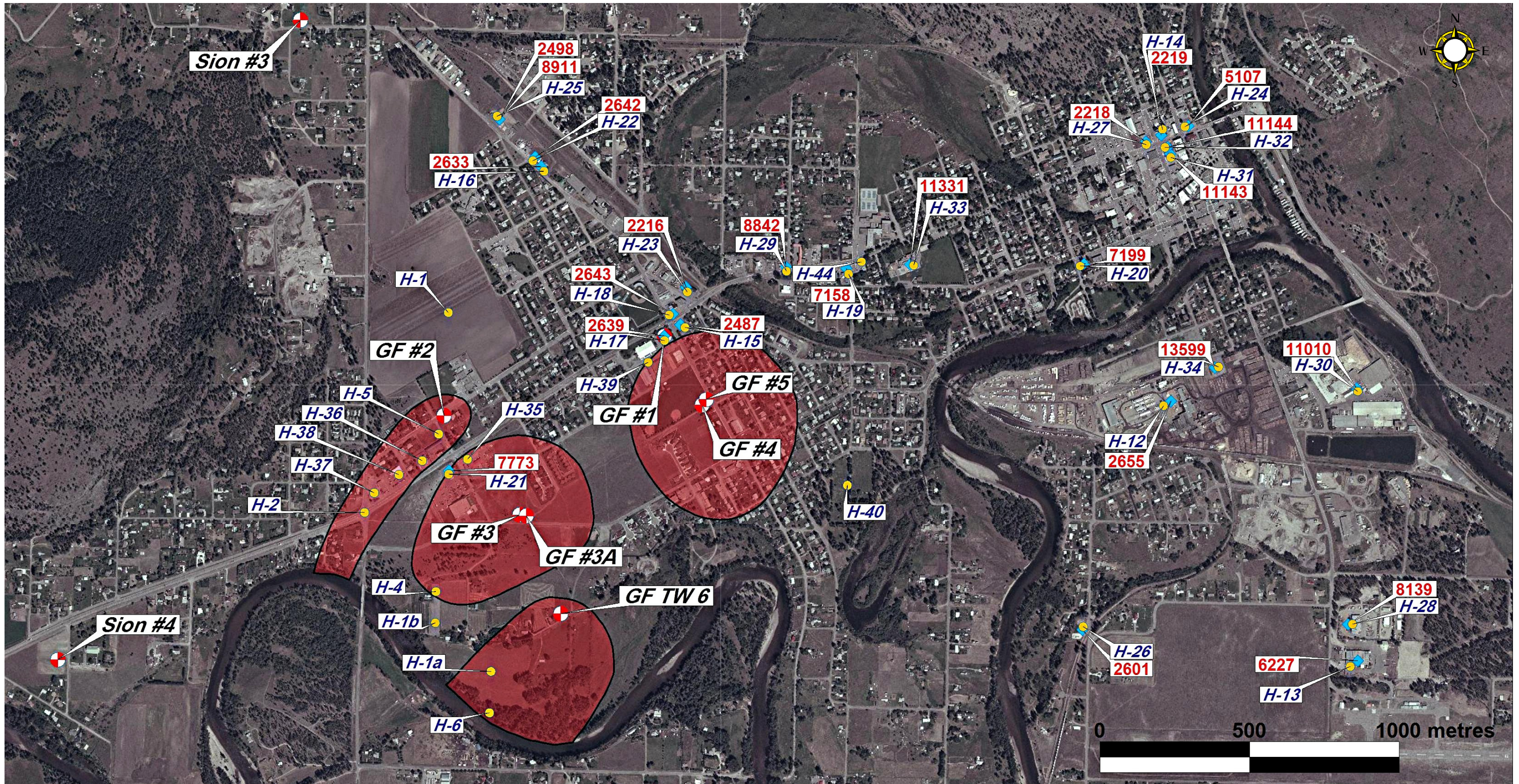
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CAPTURE ZONES FOR CITY WELLS FOR 1 YEAR TIME OF TRAVEL

BY: RA	DATE: JUNE 13
APPROVED: RA	FIG: 9



Legend

2487 BC Site Registry ID Number

H-15 Hazard Reference Number (Tables 4, 6, and 11)

Notes:

1. Hazard reference numbers not shown include H-41 (existing City wells), H-42 (other private water wells), and H-43 (future development)
2. H-1, H-1a and H-1b refer to agricultural areas with the same potential sources of contaminants

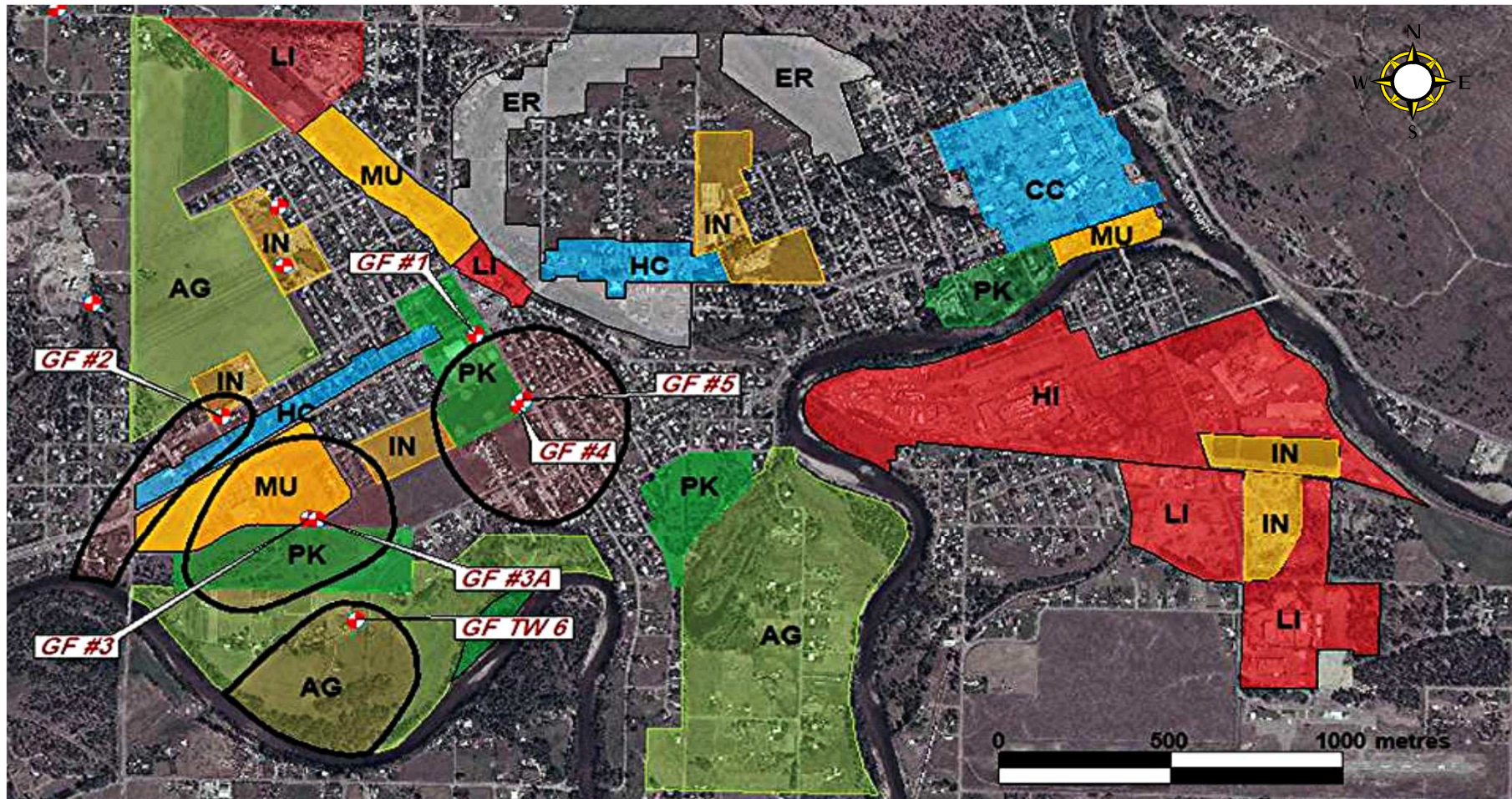
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CITY OF GRAND FORKS
WELL AND AQUIFER PROTECTION PLAN

 **PITEAU ASSOCIATES**
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LOCATIONS OF EXISTING AND POTENTIAL SOURCE HAZARDS

BY:	DATE:
RA / JM	JUN 13
APPROVED:	FIG:
RA	10



The extent of 1 year time of travel capture zones are shown as bold black lines. Land use based on 2011 City of Grand Forks Sustainable Community Plan.

Land Use Categories: PK= Park, IN= Institutional, LI= Light Industrial, HI= Heavy Industrial, AG= Agricultural, MU= Mixed Use (residential/commercial), HC= Highway Commercial, CC= Core Commercial, ER= Environmental Reserve. All other areas within City are Residential.

CITY OF GRAND FORKS WELL AND AQUIFER PROTECTION PLAN

LAND USE IN AREA OF CAPTURE ZONES FOR CITY WELLS

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BY:	RA	DATE:	JUNE 13
APPROVED:	RA	FIG:	11

APPENDIX A

WELL LOG RECORDS FOR CITY WELLS



R. Allard (November 2012)
This is Grand Forks Well 1

Report 1 - Detailed Well Record

Well Tag Number: 14654	Construction Date: 1956-01-01 00:00:00.0		
Owner: CITY OF GRAND FORKS	Driller: Not Applicable		
Address: GRAND FORKS	Well Identification Plate Number:		
	Plate Attached By:		
	Where Plate Attached:		
Area: GRAND FORKS	PRODUCTION DATA AT TIME OF DRILLING:		
WELL LOCATION:	Well Yield: 750 (Driller's Estimate) U.S. Gallons per Minute		
SIMILKAMEEN Land District	Development Method:		
District Lot: Plan: Lot: 15	Pump Test Info Flag: N		
Township: Section: Range:	Artesian Flow:		
Indian Reserve: Meridian: Block: 21	Artesian Pressure (ft):		
Quarter:	Static Level: 17 feet		
Island:	WATER QUALITY:		
BCGS Number (NAD 27): 082E008232 Well: 5	Character:		
	Colour:		
	Odour:		
Class of Well: Water supply	Well Disinfected: N		
Subclass of Well: Domestic	EMS ID:		
Orientation of Well:	Water Chemistry Info Flag: Y		
Status of Well: New	Field Chemistry Info Flag:		
Well Use: Water Supply System	Site Info (SEAM):		
Observation Well Number:			
Observation Well Status:			
Construction Method: Dug	Water Utility:		
Diameter: 0.0 inches	Water Supply System Name:		
Casing drive shoe:	Water Supply System Well Name:		
Well Depth: 91 feet			
Elevation: 1727 feet (ASL)	SURFACE SEAL:		
Final Casing Stick Up: inches	Flag: N		
Well Cap Type:	Material:		
Bedrock Depth: feet	Method:		
Lithology Info Flag: N	Depth (ft):		
File Info Flag: N	Thickness (in):		
Sieve Info Flag: N			
Screen Info Flag: N	WELL CLOSURE INFORMATION:		
	Reason For Closure:		
Site Info Details:	Method of Closure:		
Other Info Flag:	Closure Sealant Material:		
Other Info Details:	Closure Backfill Material:		
	Details of Closure:		
Screen from	to feet	Type	Slot Size
Casing from	to feet	Diameter	Material
			Drive Shoe
GENERAL REMARKS:			
LITHOLOGY INFORMATION:			
From	0 to	36 Ft.	all gravel?
From	0 to	0 Ft.	
From	0 to	0 Ft.	* Deepened Oct. 1981 by Double J. Well
From	0 to	0 Ft.	Dr. Ltd. Castlegar, BC
From	36 to	49 Ft.	fn.-cr. gravel, 65 % md.-cr. sand(clean)
From	49 to	55 Ft.	fn.-cr. sand (clean)
From	55 to	60 Ft.	fn.-md. gravel, 30 % fn.-cr. sand
From	60 to	66 Ft.	fn.-md. sand, some silt
From	66 to	78 Ft.	fn., silty, sand
From	78 to	83 Ft.	fn.-md. sand, some silt
From	83 to	87 Ft.	fn.-md. sand, some gravel (clean)
From	87 to	91 Ft.	fn.-md. sand (clean)
From	0 to	0 Ft.	
From	0 to	0 Ft.	Screen location:
From	41.3 to	43.3 Ft.	top of screen assembly - blank
From	0 to	0 Ft.	pipe and packer
From	43.3 to	48.7 Ft.	80 slot screen
From	48.7 to	59 Ft.	20 slot screen
From	0 to	0 Ft.	

From	0 to	0 Ft.	Estimated yield = 750 GPM
From	0 to	0 Ft.	
From	0 to	0 Ft.	Mulit-stage centrifugal pump in well.
From	0 to	0 Ft.	
From	0 to	0 Ft.	Aug. 15/83 - all well log footages mea-
From	0 to	0 Ft.	sured to the top of the dug well which
From	0 to	0 Ft.	is 7.3', below present ground level.
From	0 to	0 Ft.	(M.Weil)
From	0 to	0 Ft.	17/5/94 - Min. of Health, Grand Forks
From	0 to	0 Ft.	well # 1

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Report 1 - Detailed Well Record

Well Tag Number: 19226	Construction Date: 1965-04-16 00:00:00.0		
Owner: CITY OF GRAND FORKS	Driller: Budhenning Co.		
Address: GRAND FORKS	Well Identification Plate Number:		
Area: GRAND FORKS	Plate Attached By:		
WELL LOCATION:	Where Plate Attached:		
SIMILKAMEEN Land District	PRODUCTION DATA AT TIME OF DRILLING:		
District Lot: Plan: Lot:	Well Yield: 500 (Driller's Estimate) Gallons per Minute (U.S./Imperial)		
Township: Section: Range:	Development Method:		
Indian Reserve: Meridian: Block:	Pump Test Info Flag: N		
Quarter:	Artesian Flow:		
Island:	Artesian Pressure (ft):		
BCGS Number (NAD 27): 082E008232 Well: 10	Static Level: 40 feet		
Class of Well: Water supply	WATER QUALITY:		
Subclass of Well: Domestic	Character:		
Orientation of Well:	Colour:		
Status of Well: New	Odour:		
Well Use: Water Supply System	Well Disinfected: N		
Observation Well Number:	EMS ID: E217469		
Observation Well Status:	Water Chemistry Info Flag: Y		
Construction Method: Drilled	Field Chemistry Info Flag:		
Diameter: 16.0 inches	Site Info (SEAM): Y		
Casing drive shoe:	Water Utility:		
Well Depth: 100 feet	Water Supply System Name:		
Elevation: 0 feet (ASL)	Water Supply System Well Name:		
Final Casing Stick Up: inches	SURFACE SEAL:		
Well Cap Type:	Flag: N		
Bedrock Depth: feet	Material:		
Lithology Info Flag: N	Method:		
File Info Flag: N	Depth (ft):		
Sieve Info Flag: N	Thickness (in):		
Screen Info Flag: N	WELL CLOSURE INFORMATION:		
Site Info Details:	Reason For Closure:		
Other Info Flag:	Method of Closure:		
Other Info Details:	Closure Sealant Material:		
	Closure Backfill Material:		
	Details of Closure:		
Screen from	to feet	Size	Slot Size
Casing from	to feet	Diameter	Material
			Drive Shoe
GENERAL REMARKS:			
LITHOLOGY INFORMATION:			
From 0 to 0 Ft. Well deepened from 43'			
From 0 to 0 Ft. 7" test hole. April 16, 1965.			
From 0 to 0 Ft.			
From 0 to 48 Ft. dk. sand			
From 48 to 50 Ft. fine brwn sand			
From 50 to 52 Ft. crse sand (some grvl)			
From 52 to 54 Ft. fine brwn sand			
From 58 to 62 Ft. med. sand (61' - boulder?)			
From 62 to 64 Ft. crse sand			
From 67 to 76 Ft. med. sand			
From 76 to 78 Ft. yellow sandy clay			
From 78 to 90 Ft. sand & grvl (tight, hard)			
From 98 to 109 Ft. grvl (Robin egg size)			
From 109 to 114 Ft. sand -some grvl			
From 114 to 135 Ft. fine gry sand (dirty)			

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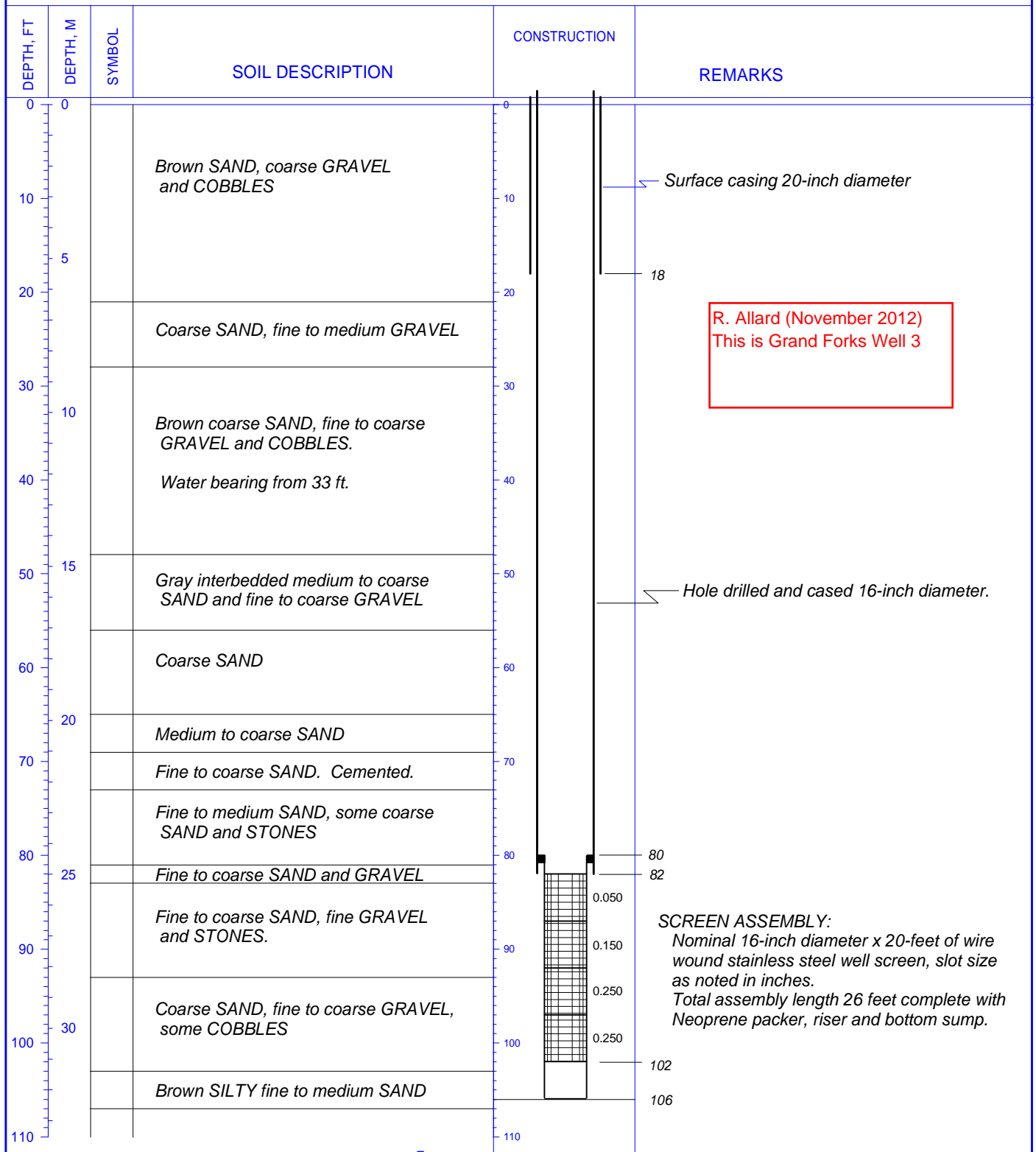
BOREHOLE NO. WELL NO. 3A

LOCATION WEST SIDE AREA

GRAND FORKS BC

DRILLER COLUMBIA WATER WELLS (1986) LTD.

EQUIPMENT B.E. 22W CABLE TOOL DRILL



CLIENT
CITY OF GRAND FORKS

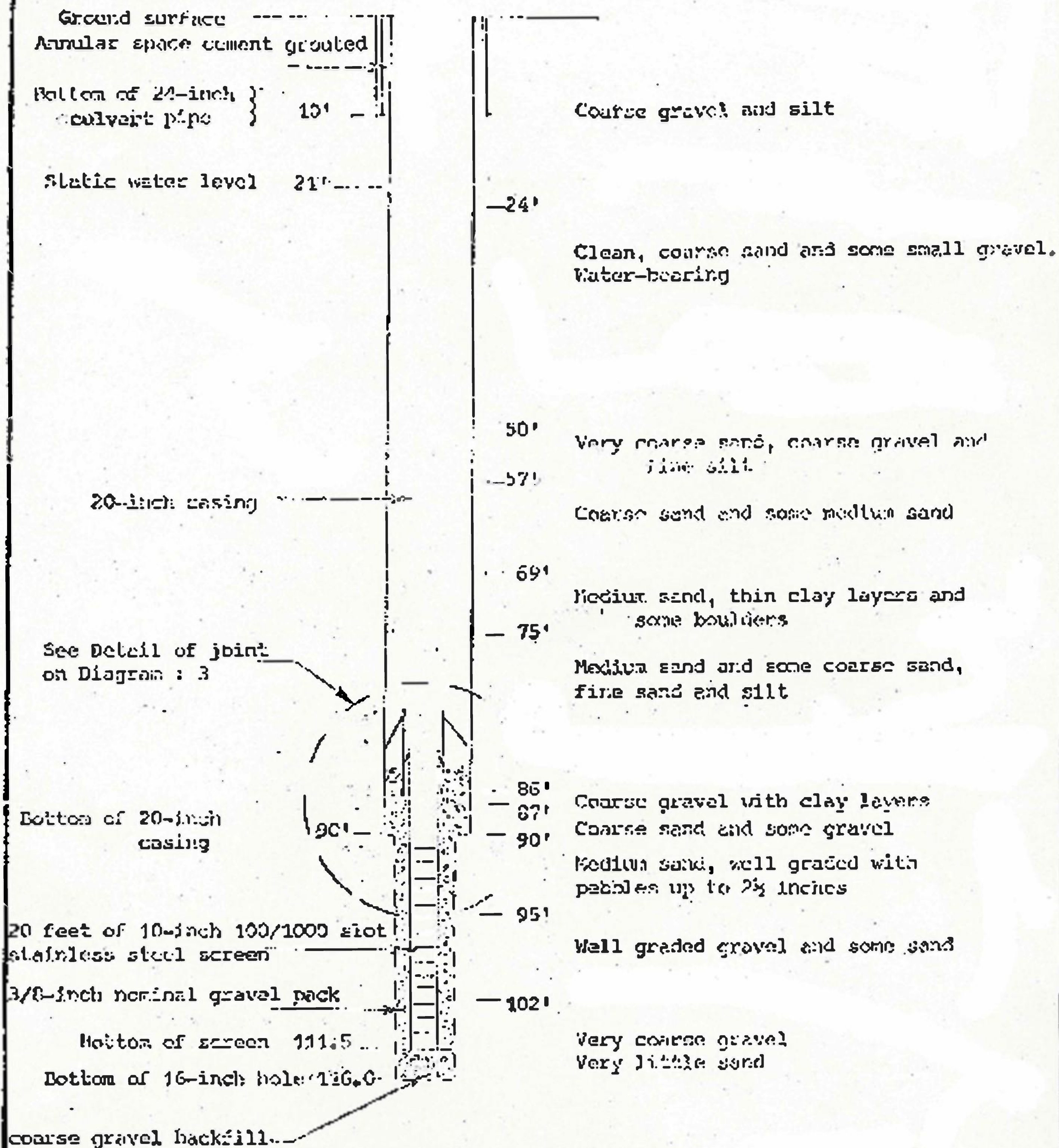
PROJECT
PRODUCTION WELL DRILLING



COLUMBIA WATER WELLS (1986) LTD.
LANGLEY BRITISH COLUMBIA

LOG OF WELL
WELL NO. 3A

W.O. NO. 2803	CONSTRUCTION DATE 15 JUL 00
BY HWR	DRAWING NO. 102



CITY OF GRAND FORKS

Grand Forks, B.C.

Log
of Production Well

ROBINSON, ROBERTS & BROWN LTD.
CONSULTING GROUNDWATER GEOLOGISTS
NORTH VANCOUVER, CANADA

June, 1969

WELL #4

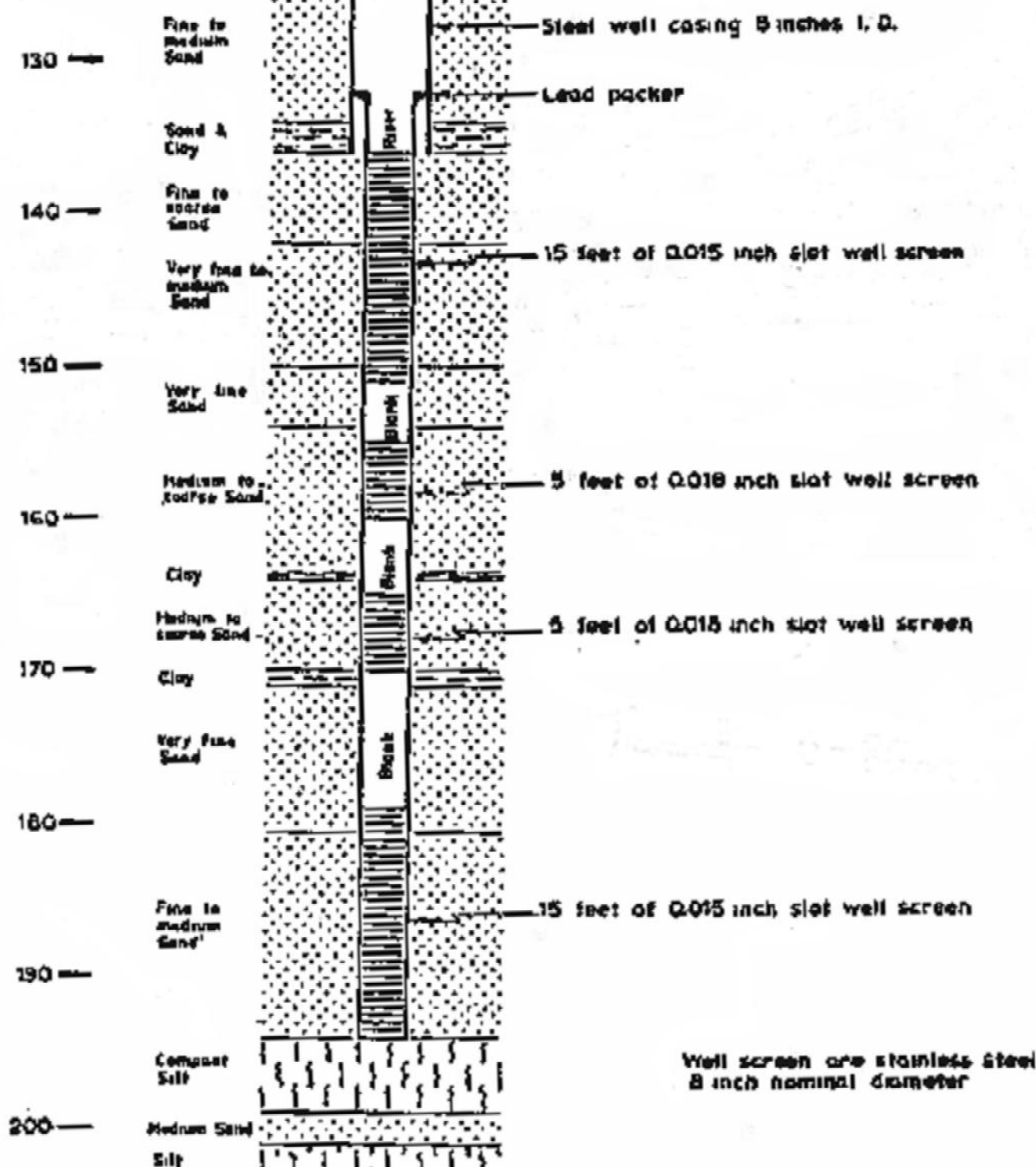
R. Allard (November 2012)
This is Grand Forks Well 4

GRAND FORKS:

T.H. 77-2

<u>Depth Below Ground</u>	<u>Description</u>
0-25	Silty sand and coarse gravel, dry.
25-45	Silty medium sand, small gravel, some silt and clay layers.
45-58	Medium sand and gravel, clean, water-bearing.
58-61	Medium to coarse sand and gravel, clean.
61-71	Fine to medium sand, good draining.
71-73	Fine to medium sand, some pebbles, water iron coloured.
73-85	Very fine sand, some silt. Tight.
85-91	Fine sand, clean.
91-103	Very fine sand, silt, good draining.
103-110	Very fine silty sand, poor draining. Some clay strips
110-116	Very fine sand, clay strips, poor draining.
116-118	Clay.
118-120	Medium to coarse sand, good draining.
120-134	Fine to medium sand, good draining.
134-136	Clay and silty clay layers in medium sand.
136-142	Fine to coarse sand, good drainage.
142-150	Very fine to medium sand, good drainage.
150-154	Very fine sand, good draining.
154-163.5	Medium to coarse, clean.
163.5-164	Clay layer.

Depth, feet



CITY OF GRAND FORKS



INTERNATIONAL GROUNDWATER CONSULTANTS LTD.
NORTH VANCOUVER, BRITISH COLUMBIA

BRITISH COLUMBIA

TEST WELL
SCREEN ASSEMBLY

BY:	HWR	DATE	11-8-77
JOB:	77-036	CHG:	1

HYDROGEOLOGIC LOG

R. Allard (November 2012)
This is Grand Forks Well 5

DRILLHOLE No. PW-5

Sheet 1 of 2

PROJECT City of Grand Forks New Well

Purpose of hole Water Supply

Coordinates:

E Angle from horizontal 0
N Bearing Azimuth

Type of drilling Cable Tool

Rig Bucyrus Erie

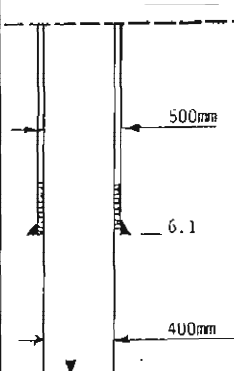
Drilling fluid water

Reference elevation 526.152 m - asl

Elevation type: Surveyed ☒Altimeter ☐From map ☐

Casing stick up 0.57 m - above ground

Job No. 87-97/8

(1)(2)* Lithology	(2)(3) Completed Construction	During Drilling				After Drilling			Comments
		(2) Depth (m)	(2)(4) Water Level (m)	(5) Water Flow (Lps)	(6) Other	(2)(7) Water Level (m)	(8) Hydraulic Conductivity		
							Test Type	Value (m/s)	
Ground level									
Silty SAND and coarse GRAVEL									Elev: top of 400 mm casing 526.822 m
4.57 5 SAND and coarse GRAVEL 6.71 Grey/brn med. SAND, few pebbles 8.53 - (517.62)									
10 Grey/brn med. SAND - coarse GRAVEL, few pebbles up to 2"						10.68 10.69 (515.46)			Feb 25, 1988 Feb 5, 1988
14.63 15 (511.52) Grey/brn med. coarse SAND, some Gravel, few pebbles									
20									
25 25.6 (500.55)		25	10.0						
30									
trace med. Gravel									
35 Grey/brn med. coarse SAND									
40									

Contractor Field Drilling
Date started Dec 3 1987
Date finished Feb 3 1988

Logged by Pm
Checked by RAD
Date Mar 1 88

SCALE, Vertical 1: 150 approximate
Horizontal - NLS

*Bracketed numbers refer to notes following the logs



PITEAU & ASSOCIATES
GEOTECHNICAL CONSULTANTS
VANCOUVER CALGARY

HYDROGEOLOGIC LOG (Continued)

DRILLHOLE NO. 1 V 3

Sheet 2 of 2


PROJECT City of Grand Forks, New Well

Reference elevation 526.152 m -asl

Job No	(1)(2)* Lithology	(2)(3) Completed Construction	During Drilling				After Drilling			Comments	
			(2)	(2)(4)	(5)	(6)	(2)(7)	(8) Hydraulic Conductivity			
			Depth (m)	Water Level (m)	Water Flow (Lps)	Other	Water Level (m)	Test Type	Value (m/s)		(2) Depth (m)
40	40.237 SILT Grey/brn md-crs SAND 0.1 41.5 (484.65) 42.8 (483.35)	41 (485.65) 400mm 250mm 44 (482.65)									
	Grey/brown fn - med. SAND, trace Silt 47.6 (478.55)							h	7.2×10^{-5}	43.0	Water temperature during pump test was approx 9.5°C
								h	1.0×10^{-4}	44.8	
								h	1.7×10^{-4}	46.6	Electrical conductivity during pump test ranged from 490 µmhos/cm after 1 hour to 430 µmhos/cm after 14 hours.
								h	1.6×10^{-4}	47.6	
	Grey/brown-coarse SAND, trace Silt, occasional gravelly (5-10%) layers 51.2 (474.95)	1.55.1 F9 Monterey Sand pack						h	1.2×10^{-4}	48.7	
								h	5.3×10^{-4}	50.0	
	Grey/brown fn-med. SAND, trace Silt occasional pebbles 0.10 54.7 Silt (471.45)							h	1.4×10^{-4}	51.2	
								h	4.2×10^{-5}	51.8	
	Grey/brown fn-med. SAND, trace Silt 0.07 59.7 (466.45)	Cement Grout Seal 59.4 (466.75)						h	2.1×10^{-4}	53.0	pH values during pump test ranged from 8.0-8.3
								h	2.1×10^{-4}	54.3	
								h	1.6×10^{-4}	54.9	
								h	2.3×10^{-4}	56.1	
								p			

Logged by PR Checked by RHD

SCALE: Vertical 1" = 150' approximate
Horizontal - N.T.S.



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* Bracketed numbers refer to notes following the logs

Logged by Pmt Checked by RHD

SCALE: Vertical 1:150 approximate
Horizontal - N.Ts.PITEAU & ASSOCIATES
GEOTECHNICAL CONSULTANTS
VANCOUVER CALGARY

* Bracketed numbers refer to notes following the logs



R. Allard (November 2012)
This is Grand Forks TW99-1

Report 1 - Detailed Well Record

<p>Well Tag Number: 75353</p> <p>Owner: CITY OF GRAND FORKS</p> <p>Address: SW END OF 18TH STREET</p> <p>Area: GRAND FORKS</p> <p>WELL LOCATION:</p> <p>SIMILKAMEEN Land District</p> <p>District Lot: 533 Plan: 67 Lot: 21</p> <p>Township: Section: Range:</p> <p>Indian Reserve: Meridian: Block: 4</p> <p>Quarter:</p> <p>Island:</p> <p>BCGS Number (NAD 27): 082E008214 Well: 45</p> <p>Class of Well:</p> <p>Subclass of Well:</p> <p>Orientation of Well:</p> <p>Status of Well: New</p> <p>Well Use: Abandoned</p> <p>Observation Well Number:</p> <p>Observation Well Status:</p> <p>Construction Method: Drilled</p> <p>Diameter: 8.0 inches</p> <p>Casing drive shoe:</p> <p>Well Depth: 193.6 feet</p> <p>Elevation: 1696 feet (ASL)</p> <p>Final Casing Stick Up: inches</p> <p>Well Cap Type:</p> <p>Bedrock Depth: feet</p> <p>Lithology Info Flag:</p> <p>File Info Flag:</p> <p>Sieve Info Flag:</p> <p>Screen Info Flag: N</p> <p>Site Info Details:</p> <p>Other Info Flag:</p> <p>Other Info Details:</p>	<p>Construction Date: 1998-11-17 00:00:00.0</p> <p>Driller: Columbia Water Wells</p> <p>Well Identification Plate Number:</p> <p>Plate Attached By:</p> <p>Where Plate Attached:</p> <p>PRODUCTION DATA AT TIME OF DRILLING:</p> <p>Well Yield: 0 (Driller's Estimate)</p> <p>Development Method:</p> <p>Pump Test Info Flag:</p> <p>Artesian Flow:</p> <p>Artesian Pressure (ft):</p> <p>Static Level:</p> <p>WATER QUALITY:</p> <p>Character:</p> <p>Colour:</p> <p>Odour:</p> <p>Well Disinfected: N</p> <p>EMS ID:</p> <p>Water Chemistry Info Flag:</p> <p>Field Chemistry Info Flag:</p> <p>Site Info (SEAM):</p> <p>Water Utility:</p> <p>Water Supply System Name:</p> <p>Water Supply System Well Name:</p> <p>SURFACE SEAL:</p> <p>Flag:</p> <p>Material:</p> <p>Method:</p> <p>Depth (ft):</p> <p>Thickness (in):</p> <p>WELL CLOSURE INFORMATION:</p> <p>Reason For Closure:</p> <p>Method of Closure:</p> <p>Closure Sealant Material:</p> <p>Closure Backfill Material:</p> <p>Details of Closure:</p>			
Screen from	to feet	Type	Slot Size	
Casing from	to feet	Diameter	Material	Drive Shoe
null	null	null	null	null
GENERAL REMARKS:				
UTM LOCATION GIVEN IS NAD 83				
LITHOLOGY INFORMATION:				
From	0 to	7 Ft.	black topsoil	
From	1 to	7 Ft.	brown silty sand	
From	7 to	19 Ft.	coarse sand and fine to coarse gravel	

From	19 to	25 Ft.	medium to fine sand, some stones
From	25 to	35.1 Ft.	fine sand, odd stones
From	35.1 to	40 Ft.	medium to fine sand
From	40 to	74.8 Ft.	fine sand, some water (<2 gpm)
From	74.8 to	89.9 Ft.	fine sand with seams of gray clay
From	89.9 to	95.1 Ft.	gray silty sand, more gray clay
From	95.1 to	105 Ft.	sand, some clay balls
From	105 to	117.1 Ft.	med. to fine sand, seams of packed silt
From	117.1 to	141 Ft.	fine to medium gray silty sand
From	141 to	161 Ft.	gray medium to fine sand and silt
From	161 to	178.1 Ft.	gray, fine silty sand, with clay seams
From	178.1 to	193.6 Ft.	gray, fine silty sand, tight

- [Return to Main](#)
- [Return to Search Options](#)
- [Return to Search Criteria](#)

Information Disclaimer

The Province disclaims all responsibility for the accuracy of information provided. Information provided should not be used as a basis for making financial or any other commitments.

HYDROGEOLOGIC LOG

Well No. **TH99-2**

Purpose of Hole: Test Production Well

Type of Rig: Cable Tool

Drill Contractor: Columbia Water Wells (1986) Ltd.

Date Drilled: July 14 - 26, 1999

Supervised by: N/A

Ground Elevation (masl): 531

Casing Stick-up (m): 0.46

Page 1 of 3

Elevation of Top of Steel Casing (m-asl): 531.5

Elev. of Top of PVC Standpipe (m-asl): n/a

Depth to Water (m): 13.71

Elevation of Water (m-asl): 517.3

Depth (m)	Elevation (m-asl)	Description of Lithology Encountered	Well Construction Materials	Well Diagram	Sample depth (m-bgrd)
0.0	531.0	Ground Surface			
2.0	530.4	Brown TOPSOIL 0.6			
4.0					
6.0	522.8	Tight coarse SAND and GRAVEL, some cobbles 8.2	203mm steel surface casing		
8.0					
10.0	520.0	Brown fine-medium SAND, some small cobbles, s 11.0			
12.0					
14.0	517.0	Well-graded SAND and GRAVEL 14.0	July 29, 1999; SWL (m) = 13.71		
16.0					
18.0	512.4	Well-graded SAND and GRAVEL 18.6			
20.0	510.6	Fine-medium SAND, some silt lenses 20.4	152mm steel casing		
22.0					
24.0	508.1	Fine-medium SAND, some silt lenses 22.9			
26.0					
28.0					
30.0					
32.0					
34.0	496.9	Fine-medium SAND, some silt lenses 34.1			
36.0	494.7	Fine-medium SAND 36.3			
38.0	492.9	Tight fine SAND and SILT 38.1			
40.0		hole continued on next page			

KERR WOOD LEIDAL ASSOCIATES



PITEAU ASSOCIATES
GEOTECHNICAL AND HYDROGEOLOGICAL CONSULTANTS
VANCOUVER CALGARY

**HYDROGEOLOGICAL ASSESSMENT OF
WATER SUPPLY WELL FOR CITY,
GRAND FORKS, B.C.**

WELL TH99-2

BY:	MDP	DATE:	AUG 99
APPROVED		FIG:	A-2

HYDROGEOLOGIC LOG

Well No. **TH99-2**

Purpose of Hole: Test Production Well

Type of Rig: Cable Tool

Drill Contractor: Columbia Water Wells (1986) Ltd.

Date Drilled:

Supervised by:

Ground Elevation (masl): 531

Casing Stick-up (m): 0.46

Elevation of Top of Steel Casing (m-asl): 531.5

Elev. of Top of PVC Standpipe (m-asl): n/a

Depth to Water (m): 13.7

Elevation of Water (m-asl): 517

Page 2 of 3

Depth (m)	Elevation (m-asl)	Description of Lithology Encountered	Well Construction Materials	Well Diagram	Sample depth (m-bgrd)
40.0	491.0	continued from page 1			
42.0			0.6m riser and K-packer		
44.0			3m of 0.3mm (0.012") telescopic screen (140mm I.D.)		
46.0	484.7	Fine-medium SAND, some silt 46.3			
48.0			bail bottom		
50.0					
52.0					
54.0					
56.0					
58.0	473.7	Silty fine SAND, some tight silt lenses 57.3			
60.0	470.6	Brown, fine-medium SAND, some silt 60.4			
62.0					
64.0	468.2	Fine-medium silty SAND, some tight silt lenses 62.8	backfill		
66.0					
68.0	463.9	Fine silty SAND, some silt lenses 67.1			
70.0					
72.0					
74.0	457.8	Brown fine SAND, some silt 73.2			
76.0					
78.0	453.3	Brown fine SAND, some silt 77.7			
80.0		hole continued on next page			

KERR WOOD LEIDAL ASSOCIATES



PITEAU ASSOCIATES
GEOTECHNICAL AND HYDROGEOLOGICAL CONSULTANTS

**HYDROGEOLOGICAL ASSESSMENT OF
WATER SUPPLY WELL FOR CITY,
GRAND FORKS, B.C.**

WELL TH99-2

BY:	DATE:
MDP	AUG 99
APPROVED	FIG:
	A-2

APPENDIX B

GWUDI/GARP SCREENING FORMS

City of Grand Forks Groundwater Management Options Assessment
GWUDI GARP Screening Tool

WATER SYSTEM NAME		WELL NAME and/or BCMOE WELL ID PLATE NO.	
City of Grand Forks		Well 2	
SITE LOCATION		Well Log Examined (Y/N) Yes	
392461E, 5431281N (UTM 10)		Site Survey Conducted (Y/N) Yes	
RISK FACTORS and CRITERIA	YES: Potentially At Risk	NO: Low Risk	COMMENTS
1. Water Quality Results			
1.1: Water system or well bacteriological sampling shows recurring presence of confirmed total coliform, fecal coliform, or <i>E.coli</i> .		No	
1.2: Water system has historical turbidity issues associated with the source water.		No	
2. Source Type and Location			
2.1: Well situated inside setback distances of the HHR, from possible source of contamination.		No	
2.2: Well with intake depth <15 m below ground and located in floodplain / flood-prone area. OR well <100 m outside the high-water mark or natural boundary of surface water feature and intake depth <15 m below the high-water level.		No	
3. Well Construction			
3.1: Well does not meet GWPR (section 7) for surface sealing.		No	well constructed in 1965 (prior to 2005). pump house and concrete pad atop well head
3.2: Well does not meet GWPR (section 10) for well caps and covers.		No	
3.3: Well does not meet GWPR (section 11) for floodproofing.		No	
3.4: Well does not meet GWPR (section 12) for wellhead protection.		No	
4. Aquifer Type and Setting			
4.1: Well with intake depth <15 m below ground and situated in a sand and/or gravel unconfined aquifer or fractured bedrock aquifer.		No	
4.2: Well completed in a karst bedrock aquifer.		No	
RISK / VULNERABILITY ASSESSMENT DECISION TAKEN AND REASON(S):			
ACTION RECOMMENDATION:			
CHECKLIST / ASSESSMENT COMPLETED BY: Remi Allard, P. Eng. (Piteau Associates Engineering Ltd.)			DATE COMPLETED: 28 September 2012

City of Grand Forks Groundwater Management Options Assessment
GWUDI GARP Screening Tool

WATER SYSTEM NAME		WELL NAME and/or BCMOE WELL ID PLATE NO.	
City of Grand Forks		Well 3	
SITE LOCATION		Well Log Examined (Y/N) Yes	
392720E, 5430952 N (UTM 10)		Site Survey Conducted (Y/N) Yes	
RISK FACTORS and CRITERIA	YES: Potentially At Risk	NO: Low Risk	COMMENTS
1. Water Quality Results			
1.1: Water system or well bacteriological sampling shows recurring presence of confirmed total coliform, fecal coliform, or <i>E.coli</i> .		No	
1.2: Water system has historical turbidity issues associated with the source water.		No	
2. Source Type and Location			
2.1: Well situated inside setback distances of the HHR, from possible source of contamination.		No	
2.2: Well with intake depth <15 m below ground and located in floodplain / flood-prone area. OR well <100 m outside the high-water mark or natural boundary of surface water feature and intake depth <15 m below the high-water level.		No	
3. Well Construction			
3.1: Well does not meet GWPR (section 7) for surface sealing.		No	well constructed in 2000 (pre 2005). pump house and concrete pad atop well head
3.2: Well does not meet GWPR (section 10) for well caps and covers.		No	
3.3: Well does not meet GWPR (section 11) for floodproofing.		No	
3.4: Well does not meet GWPR (section 12) for wellhead protection.		No	
4. Aquifer Type and Setting			
4.1: Well with intake depth <15 m below ground and situated in a sand and/or gravel unconfined aquifer or fractured bedrock aquifer.		No	
4.2: Well completed in a karst bedrock aquifer.		No	
RISK / VULNERABILITY ASSESSMENT DECISION TAKEN AND REASON(S):			
ACTION RECOMMENDATION:			
CHECKLIST / ASSESSMENT COMPLETED BY: Remi Allard, P. Eng. (Piteau Associates Engineering Ltd.)			DATE COMPLETED: 28 September 2012

City of Grand Forks Groundwater Management Options Assessment
GWUDI GARP Screening Tool

WATER SYSTEM NAME		WELL NAME and/or BCMOE WELL ID PLATE NO.	
City of Grand Forks		Well 3A	
SITE LOCATION		Well Log Examined (Y/N) Yes	
392700E, 5430957N (UTM 10)		Site Survey Conducted (Y/N) Yes	
RISK FACTORS and CRITERIA	YES: Potentially At Risk	NO: Low Risk	COMMENTS
1. Water Quality Results			
1.1: Water system or well bacteriological sampling shows recurring presence of confirmed total coliform, fecal coliform, or <i>E.coli</i> .		No	
1.2: Water system has historical turbidity issues associated with the source water.		No	
2. Source Type and Location			
2.1: Well situated inside setback distances of the HHR, from possible source of contamination.		No	
2.2: Well with intake depth <15 m below ground and located in floodplain / flood-prone area. OR well <100 m outside the high-water mark or natural boundary of surface water feature and intake depth <15 m below the high-water level.		No	
3. Well Construction			
3.1: Well does not meet GWPR (section 7) for surface sealing.		No	well constructed in 1969 (pre 2005). pump house and concrete pad atop well head
3.2: Well does not meet GWPR (section 10) for well caps and covers.		No	
3.3: Well does not meet GWPR (section 11) for floodproofing.		No	
3.4: Well does not meet GWPR (section 12) for wellhead protection.		No	
4. Aquifer Type and Setting			
4.1: Well with intake depth <15 m below ground and situated in a sand and/or gravel unconfined aquifer or fractured bedrock aquifer.		No	
4.2: Well completed in a karst bedrock aquifer.		No	
RISK / VULNERABILITY ASSESSMENT DECISION TAKEN AND REASON(S):			
ACTION RECOMMENDATION:			
CHECKLIST / ASSESSMENT COMPLETED BY: Remi Allard, P. Eng. (Piteau Associates Engineering Ltd.)			DATE COMPLETED: 28 September 2012

City of Grand Forks Groundwater Management Options Assessment
GWUDI GARP Screening Tool

WATER SYSTEM NAME		WELL NAME and/or BCMOE WELL ID PLATE NO.	
City of Grand Forks		Well 4	
SITE LOCATION		Well Log Examined (Y/N) Yes	
393316E, 5431312 (UTM 10)		Site Survey Conducted (Y/N) Yes	
RISK FACTORS and CRITERIA	YES: Potentially At Risk	NO: Low Risk	COMMENTS
1. Water Quality Results			
1.1: Water system or well bacteriological sampling shows recurring presence of confirmed total coliform, fecal coliform, or <i>E.coli</i> .		No	
1.2: Water system has historical turbidity issues associated with the source water.		No	
2. Source Type and Location			
2.1: Well situated inside setback distances of the HHR, from possible source of contamination.		No	
2.2: Well with intake depth <15 m below ground and located in floodplain / flood-prone area. OR well <100 m outside the high-water mark or natural boundary of surface water feature and intake depth <15 m below the high-water level.		No	
3. Well Construction			
3.1: Well does not meet GWPR (section 7) for surface sealing.		No	well constructed in 1977 (pre 2005). pump house and concrete pad atop well head
3.2: Well does not meet GWPR (section 10) for well caps and covers.		No	
3.3: Well does not meet GWPR (section 11) for floodproofing.		No	
3.4: Well does not meet GWPR (section 12) for wellhead protection.		No	
4. Aquifer Type and Setting			
4.1: Well with intake depth <15 m below ground and situated in a sand and/or gravel unconfined aquifer or fractured bedrock aquifer.		No	
4.2: Well completed in a karst bedrock aquifer.		No	
RISK / VULNERABILITY ASSESSMENT DECISION TAKEN AND REASON(S):			
ACTION RECOMMENDATION:			
CHECKLIST / ASSESSMENT COMPLETED BY: Remi Allard, P. Eng. (Piteau Associates Engineering Ltd.)			DATE COMPLETED: 28 September 2012

City of Grand Forks Groundwater Management Options Assessment
GWUDI GARP Screening Tool

WATER SYSTEM NAME	WELL NAME and/or BCMOE WELL ID PLATE NO.		
City of Grand Forks	Well 5		
SITE LOCATION	Well Log Examined (Y/N) Yes		
393329E, 5431332N (UTM 10)	Site Survey Conducted (Y/N) Yes		
RISK FACTORS and CRITERIA	YES: Potentially At Risk	NO: Low Risk	COMMENTS
1. Water Quality Results			
1.1: Water system or well bacteriological sampling shows recurring presence of confirmed total coliform, fecal coliform, or <i>E.coli</i> .		No	
1.2: Water system has historical turbidity issues associated with the source water.		No	
2. Source Type and Location			
2.1: Well situated inside setback distances of the HHR, from possible source of contamination.		No	
2.2: Well with intake depth <15 m below ground and located in floodplain / flood-prone area. OR well <100 m outside the high-water mark or natural boundary of surface water feature and intake depth <15 m below the high-water level.		No	
3. Well Construction			
3.1: Well does not meet GWPR (section 7) for surface sealing.		No	well constructed in 1988 (pre 2005). pump house and concrete pad atop well head
3.2: Well does not meet GWPR (section 10) for well caps and covers.		No	
3.3: Well does not meet GWPR (section 11) for floodproofing.		No	
3.4: Well does not meet GWPR (section 12) for wellhead protection.		No	
4. Aquifer Type and Setting			
4.1: Well with intake depth <15 m below ground and situated in a sand and/or gravel unconfined aquifer or fractured bedrock aquifer.		No	
4.2: Well completed in a karst bedrock aquifer.		No	
RISK / VULNERABILITY ASSESSMENT DECISION TAKEN AND REASON(S):			
ACTION RECOMMENDATION:			
CHECKLIST / ASSESSMENT COMPLETED BY: Remi Allard, P. Eng. (Piteau Associates Engineering Ltd.)			DATE COMPLETED: 28 September 2012

City of Grand Forks Groundwater Management Options Assessment
GWUDI GARP Screening Tool

WATER SYSTEM NAME		WELL NAME and/or BCMOE WELL ID PLATE NO.	
City of Grand Forks		TW 99-2 (Hospital Well)	
SITE LOCATION		Well Log Examined (Y/N) Yes	
392629E, 5431955N (UTM 10)		Site Survey Conducted (Y/N) Yes	
RISK FACTORS and CRITERIA	YES: Potentially At Risk	NO: Low Risk	COMMENTS
1. Water Quality Results			
1.1: Water system or well bacteriological sampling shows recurring presence of confirmed total coliform, fecal coliform, or <i>E.coli</i> .		No	
1.2: Water system has historical turbidity issues associated with the source water.		No	
2. Source Type and Location			
2.1: Well situated inside setback distances of the HHR, from possible source of contamination.		No	
2.2: Well with intake depth <15 m below ground and located in floodplain / flood-prone area. OR well <100 m outside the high-water mark or natural boundary of surface water feature and intake depth <15 m below the high-water level.		No	
3. Well Construction			
3.1: Well does not meet GWPR (section 7) for surface sealing.		No	well constructed in 1999 (pre 2005). pump house and concrete pad atop well head
3.2: Well does not meet GWPR (section 10) for well caps and covers.		No	
3.3: Well does not meet GWPR (section 11) for floodproofing.		No	
3.4: Well does not meet GWPR (section 12) for wellhead protection.		No	
4. Aquifer Type and Setting			
4.1: Well with intake depth <15 m below ground and situated in a sand and/or gravel unconfined aquifer or fractured bedrock aquifer.		No	
4.2: Well completed in a karst bedrock aquifer.		No	
RISK / VULNERABILITY ASSESSMENT DECISION TAKEN AND REASON(S):			
ACTION RECOMMENDATION:			
CHECKLIST / ASSESSMENT COMPLETED BY: Remi Allard, P. Eng. (Piteau Associates Engineering Ltd.)			DATE COMPLETED: 28 September 2012

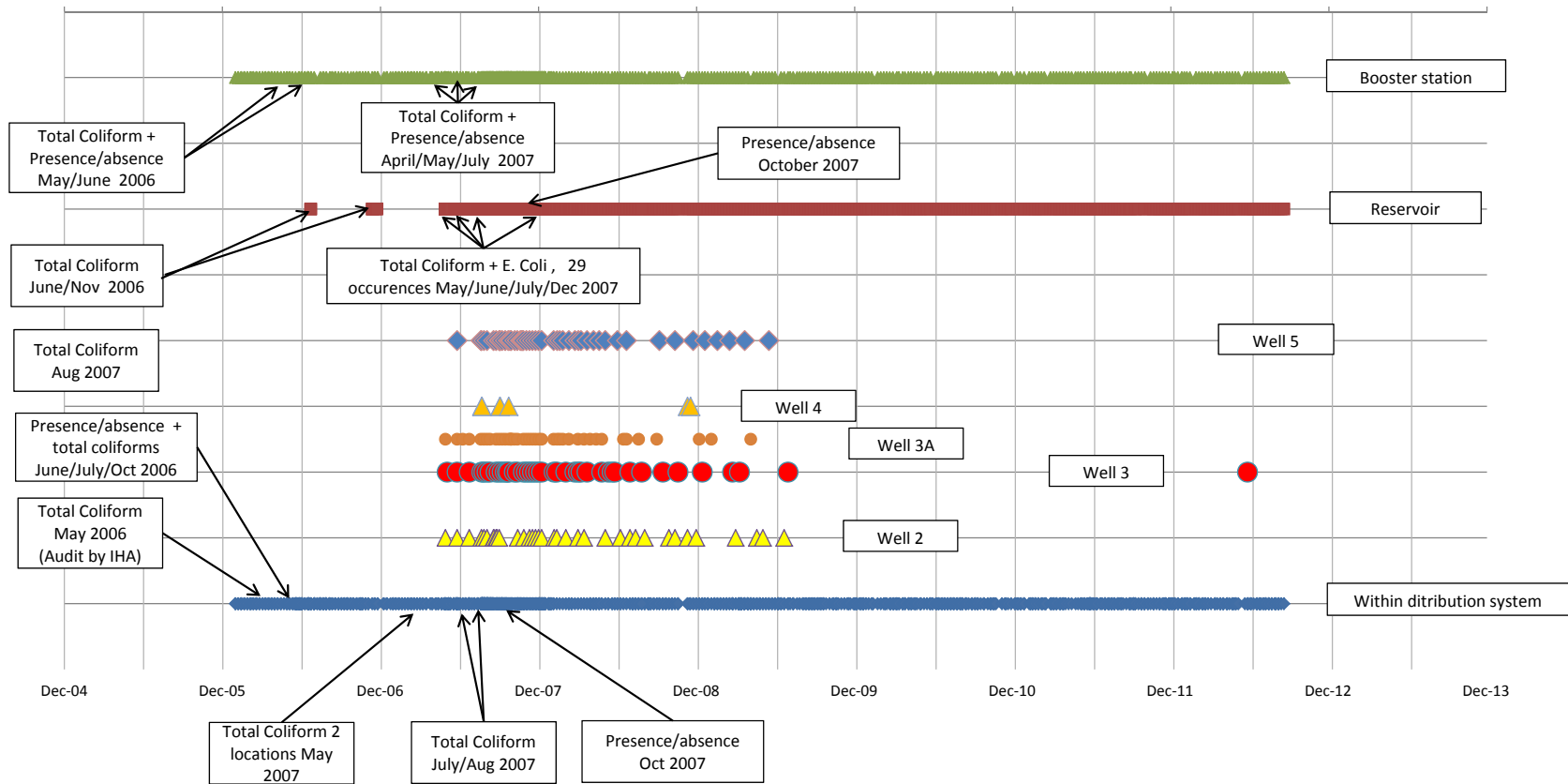
City of Grand Forks Groundwater Management Options Assessment
GWUDI GARP Screening Tool

WATER SYSTEM NAME		WELL NAME and/or BCMOE WELL ID PLATE NO.	
City of Grand Forks		Proposed well 6	
SITE LOCATION		Well Log Examined (Y/N) Yes	
392841E, 5430633N (UTM 10)		Site Survey Conducted (Y/N) Yes	
RISK FACTORS and CRITERIA	YES: Potentially At Risk	NO: Low Risk	COMMENTS
1. Water Quality Results			
1.1: Water system or well bacteriological sampling shows recurring presence of confirmed total coliform, fecal coliform, or <i>E.coli</i> .		No	Well has not been constructed
1.2: Water system has historical turbidity issues associated with the source water.		No	Well has not been constructed
2. Source Type and Location			
2.1: Well situated inside setback distances of the HHR, from possible source of contamination.		No	
2.2: Well with intake depth <15 m below ground and located in floodplain / flood-prone area. OR well <100 m outside the high-water mark or natural boundary of surface water feature and intake depth <15 m below the high-water level.		No	
3. Well Construction			
3.1: Well does not meet GWPR (section 7) for surface sealing.		No	
3.2: Well does not meet GWPR (section 10) for well caps and covers.		No	
3.3: Well does not meet GWPR (section 11) for floodproofing.		No	
3.4: Well does not meet GWPR (section 12) for wellhead protection.		No	
4. Aquifer Type and Setting			
4.1: Well with intake depth <15 m below ground and situated in a sand and/or gravel unconfined aquifer or fractured bedrock aquifer.		No	
4.2: Well completed in a karst bedrock aquifer.		No	
RISK / VULNERABILITY ASSESSMENT DECISION TAKEN AND REASON(S):			
ACTION RECOMMENDATION:			
CHECKLIST / ASSESSMENT COMPLETED BY: Remi Allard, P. Eng. (Piteau Associates Engineering Ltd.)			DATE COMPLETED: 28 September 2012

APPENDIX C

HISTORICAL BACTERIOLOGICAL TEST RESULTS FOR CITY WELLS

Bacteriological Sampling Grand Forks Water System 2005 to 2012



**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
3-Jan-06	Valley Heights Booster	0	0		Tested at Caro Lab
3-Jan-06	Boundary Hospital	0	0		Tested at Caro Lab
3-Jan-06	Aquatic Center	X		NEG	Tested in House
9-Jan-06	Valley Heights Booster	X		NEG	Tested in House
9-Jan-06	Treatment Plant	X		NEG	Tested in House
10-Jan-06	Valley Heights Booster	0	0		Tested at Caro Lab
10-Jan-06	Boundary Hospital	0	0		Tested at Caro Lab
16-Jan-06	Valley Heights Booster	X		NEG	Tested in House
16-Jan-06	Fire Hall	X		NEG	Tested in House
16-Jan-06	Aquatic Center	X		NEG	Tested in House
17-Jan-06	Valley Heights Booster	0	0		Tested at Caro Lab
17-Jan-06	Boundary Hospital	0	0		Tested at Caro Lab
23-Jan-06	Valley Heights Booster	X		NEG	Tested in House
23-Jan-06	Boundary Electric	X		NEG	Tested in House
24-Jan-06	Valley Heights Booster	0	0		Tested at Caro Lab
24-Jan-06	Jan 31 2006	0	0		Tested at Caro Lab
30-Jan-06	Valley Heights Booster	X		NEG/ back ground	Tested in House
30-Jan-06	Hutton School	X		NEG	Tested in House
31-Jan-06	Valley Heights Booster	0	0		Tested at Caro Lab
31-Jan-06	Boundary Hospital	0	0		Tested at Caro Lab
6-Feb-06	Works Yard	X		NEG	Tested in House
6-Feb-06	Valley Heights Booster	X		NEG	Tested in House
6-Feb-06	Boundary Hospital	X		NEG	Tested in House
8-Feb-06	Valley Heights Booster	0	0		Tested at Caro Lab
8-Feb-06	Boundary Hospital	0	0		Tested at Caro Lab
13-Feb-06	Valley Heights Booster	X		NEG	Tested in House
13-Feb-06	1524 77th Ave.	X		NEG	Tested in House
14-Feb-06	Valley Heights Booster	0	0		Tested at Caro Lab
14-Feb-06	Boundary Hospital	0	0		Tested at Caro Lab
20-Feb-06	Valley Heights Booster	X		NEG/ back ground	Tested in House
20-Feb-06	Selkirk College	X		NEG	Tested in House
20-Feb-06	B & F Sales	X		NEG	Tested in House
21-Feb-06	Valley Heights Booster	0	0		Tested at Caro Lab
21-Feb-06	Boundary Hospital	0	0		Tested at Caro Lab
27-Feb-06	Valley Heights Booster	X		NEG	Tested in House
27-Feb-06	Black Knight Market	X		NEG	Tested in House
28-Feb-06	Valley Heights Booster	0	0		Tested at Caro Lab
28-Feb-06	Boundary Hospital	0	0		Tested at Caro Lab
7-Mar-06	Valley Heights Booster	0	0		Tested at Caro Lab
7-Mar-06	Valley Heights Booster	X		NEG	Tested in House
7-Mar-06	Petro Canada	X		NEG	Tested in House
7-Mar-06	Boundary Hospital	0	0		Tested at Caro Lab
13-Mar-06	Valley Heights Booster	X		NEG	Tested in House
13-Mar-06	Aquatic Center	X		NEG	Tested in House
14-Mar-06	Valley Heights Booster	0	0		Tested at Caro Lab
14-Mar-06	Boundary Hospital	0	0		Tested at Caro Lab
20-Mar-06	Valley Heights Booster	X		NEG/ back ground	Tested in House
20-Mar-06	Boundary Hospital	X		NEG	Tested in House
21-Mar-06	Valley Heights Booster	0	0		Tested at Caro Lab
21-Mar-06	Boundary Hospital	0	0		Tested at Caro Lab
27-Mar-06	WWTF	X		NEG	Tested in House
27-Mar-06	Valley Heights Booster	X		NEG	Tested in House
28-Mar-06	Valley Heights Booster	0	0		Tested at Caro Lab
28-Mar-06	Boundary Hospital	0	0		Tested at Caro Lab
3-Apr-06	Valley Heights Booster	X		NEG/ back ground	Tested in House
3-Apr-06	Fire Hall	X		NEG	Tested in House
3-Apr-06	Aquatic Center	X		NEG	Tested in House
4-Apr-06	Valley Heights Booster	0	0		Tested at Caro Lab
4-Apr-06	Boundary Hospital	0	0		Tested at Caro Lab
10-Apr-06	Valley Heights Booster	X		NEG/ back ground	Tested in House
10-Apr-06	Hutton School	X		NEG	Tested in House
11-Apr-06	Valley Heights Booster	0	0		Tested at Caro Lab
11-Apr-06	Boundary Hospital	0	0		Tested at Caro Lab
18-Apr-06	WWTF	X		NEG	Tested in House
18-Apr-06	Valley Heights Booster	X		NEG	Tested in House
18-Apr-06	Valley Heights Booster	0	0		Tested at Caro Lab
18-Apr-06	Boundary Hospital	0	0		Tested at Caro Lab
25-Apr-06	Valley Heights Booster	0	0		Tested at Caro Lab
25-Apr-06	Boundary Hospital	0	0		Tested at Caro Lab
1-May-06	Valley Heights Booster	X		NEG	Tested in House
1-May-06	Boundary Hospital	X		NEG	Tested in House
3-May-06	Valley Heights Booster	0	0		Tested at Caro Lab
3-May-06	Boundary Hospital	0	0		Tested at Caro Lab
8-May-06	Valley Heights Booster	X		NEG/ back ground	Tested in House
8-May-06	Aquatic Center	X		NEG	Tested in House
9-May-06	Valley Heights Booster	0	0		Tested at Caro Lab
9-May-06	City Hall	0	0		Tested at Caro Lab
15-May-06	Valley Heights Booster	X		NEG	Tested in House
15-May-06	Hutton School	X		NEG	Tested in House
16-May-06	Tested in House	0	0		Tested at Caro Lab
16-May-06	Boundary Hospital	0	0		Tested at Caro Lab
22-May-06	Valley Heights Booster	0	0	background	Tested at Caro Lab
22-May-06	Jake Raven's 2nd st.	X		NEG	Tested in House

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
22-May-06	Jake Raven's 2nd st.	0	0		Tested at Caro Lab
22-May-06	Cemetery	X		NEG	Tested in House
22-May-06	Cemetery	0	0		Tested at Caro Lab
22-May-06	Boundary Hospital	0	0		Tested at Caro Lab
22-May-06	7645 Granby rd.	X		NEG/ back ground	Tested in House
22-May-06	7645 Granby rd.	0	0		Tested at Caro Lab
25-May-06	Granby Rd.	2	< 1		Audit by I.H.A.
25-May-06	7649 22nd st.	< 1	< 1		Audit by I.H.A.
25-May-06	7130 9th st.	< 1	< 1		Audit by I.H.A.
25-May-06	7007 27th st.	< 1	< 1		Audit by I.H.A.
25-May-06	236 Market st.	< 1	< 1		Audit by I.H.A.
29-May-06	Valley Heights Booster	X		NEG	Tested in House
29-May-06	Donaldson Fountain	X		NEG	Tested in House
29-May-06	Bartlett Park Fountain	X		NEG	Tested in House
31-May-06	Valley Heights Booster	11	0	background	Tested at Caro Lab
31-May-06	Boundary Hospital	0	0		Tested at Caro Lab
31-May-06	#4 7625 Granby Rd.	X		NEG/ back ground	Tested in House
31-May-06	#4 7625 Granby Rd.	0	0		Tested at Caro Lab
31-May-06	#2 7625 Granby Rd.	X		NEG	Tested in House
31-May-06	#14 7625 Granby Rd.	X		NEG	Tested in House
2-Jun-06	7434 Valley Heights	4	0		Tested at Caro Lab
2-Jun-06	7389 Valley Heights	3	0		Tested at Caro Lab
5-Jun-06	Valley Heights Booster	X	X	NEG	Tested in House
5-Jun-06	Skate Park	X	X	NEG	Tested in House
5-Jun-06	Boundary Hospital	X	X	NEG	Tested in House
5-Jun-06	243 Winnipeg Ave.	X	X	NEG/ back ground	Tested in House
5-Jun-06	128 Victoria Way	X	X	NEG	Tested in House
6-Jun-06	Valley Heights Booster	1	0		Tested at Caro Lab
6-Jun-06	129 Victoria Way	5	0		Tested at Caro Lab
6-Jun-06	Boundary Hospital	0	0		Tested at Caro Lab
6-Jun-06	7389 Valley Heights	0	0		Tested at Caro Lab
12-Jun-06	7389 Valley Heights	1	0	background	Tested at Caro Lab
12-Jun-06	Valley Heights Booster	0	0	background	Tested at Caro Lab
13-Jun-06	Valley Heights Booster	0	0		Tested at Caro Lab
13-Jun-06	Boundary Hospital	0	0		Tested at Caro Lab
19-Jun-06	Valley Heights Booster	X	X	Pos/ pumps off	Tested in House
19-Jun-06	Boundary Hospital	X	X	Neg	Tested in House
19-Jun-06	Bartlett Park Fountain	X	X		Tested in House
20-Jun-06	Valley Heights Booster	X	X	Pos/ pumps off	Tested in House
20-Jun-06	Valley Heights Booster	3	0	background	Tested at Caro Lab
20-Jun-06	Valley Heights Booster	0	0	background	Tested at Caro Lab
20-Jun-06	Boundary Hospital	0	0		Tested at Caro Lab
20-Jun-06	#2 Valley Heights	X	X	NEG/ pumps on	Tested in House
20-Jun-06	#1 Valley Heights	X	X	NEG/ pumps on	Tested in House
21-Jun-06	#1 Valley Heights	X	X	Pos/ pumps off	Tested in House
21-Jun-06	#2 Valley Heights	X	X	Pos/ pumps off	Tested in House
21-Jun-06	#2 Valley Heights	X	X	NEG/ pumps on	Tested in House
21-Jun-06	#1 Valley Heights	X	X	NEG/ pumps on	Tested in House
22-Jun-06	#2 Valley Heights	0	0	pumps on	Tested at Caro Lab
22-Jun-06	#1 Valley Heights	0	0	pumps on	Tested at Caro Lab
26-Jun-06	Main Res standpipe	X	X	Pos/ pumps off	Tested in House
26-Jun-06	Valley Heights Booster	X	X	NEG/ pumps on	Tested in House
26-Jun-06	Market st Fountain	X	X	NEG	Tested in House
26-Jun-06	Main Res standpipe	X	X	NEG/ pumps on	Tested in House
26-Jun-06	Bartlett Park Fountain	X	X	NEG	Tested in House
27-Jun-06	Valley Heights Booster	0	0		Tested at Caro Lab
27-Jun-06	Boundary Hospital	0	0		Tested at Caro Lab
27-Jun-06	7389 Valley Heights	0	0		Tested at Caro Lab
4-Jul-06	Valley Heights Booster	0	0		Tested at Caro Lab
4-Jul-06	Market st Fountain	X	X	NEG	Tested in House
4-Jul-06	Jim Fields V.H.	X	X	NEG	Tested in House
4-Jul-06	Fire Hall	X	X	NEG	Tested in House
4-Jul-06	Boundary Hospital	0	0		Tested at Caro Lab
4-Jul-06	Bartlett Park Fountain	X	X	NEG	Tested in House
4-Jul-06	7389 Valley Heights	0	0		Tested at Caro Lab
11-Jul-06	City Hall	0	0		Tested at Caro Lab
11-Jul-06	Boundary Hospital	0	0		Tested at Caro Lab
17-Jul-06	Market st Fountain	X	X	POS	Tested in House
17-Jul-06	Donaldson Fountain	X	X	NEG	Tested in House
17-Jul-06	128 Victoria Way	X	X	NEG	Tested in House
18-Jul-06	Valley Heights Booster	0	0		Tested at Caro Lab
18-Jul-06	Market st Fountain	X	X	NEG	Tested in House
18-Jul-06	City Hall	0	0		Tested at Caro Lab
18-Jul-06	Boundary Hospital	0	0		Tested at Caro Lab
24-Jul-06	Valley Heights Booster	X	X	NEG	Tested in House
24-Jul-06	Market st Fountain	X	X	NEG	Tested in House
24-Jul-06	#46 7225 Boundary Dr.	X	X	NEG	Tested in House
26-Jul-06	Valley Heights Booster	0	0		Tested at Caro Lab
26-Jul-06	Firehall	0	0		Tested at Caro Lab
26-Jul-06	Boundary Hospital	0	0		Tested at Caro Lab
31-Jul-06	Skate Park	X	X	NEG	Tested in House
31-Jul-06	Market st Fountain	X	X	NEG	Tested in House

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
31-Jul-06	1349 67th Ave.	X	X	NEG	Tested in House
31-Jul-06	128 Victoria Way	X	X	NEG	Tested in House
1-Aug-06	Valley Heights Booster	0	0		Tested at Caro Lab
1-Aug-06	Boundary Hospital	0	0		Tested at Caro Lab
1-Aug-06	1349 67th ave	0	0		Tested at Caro Lab
8-Aug-06	Victoria Way	X	X	NEG	Tested in House
8-Aug-06	Market st Fountain	X	X	NEG	Tested in House
8-Aug-06	Donaldson Fountain	X	X	NEG	Tested in House
9-Aug-06	Valley Heights Booster	0	0		Tested at Caro Lab
9-Aug-06	Boundary Hospital	0	0		Tested at Caro Lab
14-Aug-06	Valley Heights Booster	X	X	NEG	Tested in House
14-Aug-06	Market st Fountain	X	X	NEG	Tested in House
15-Aug-06	Valley Heights Booster	0	0		Tested at Caro Lab
15-Aug-06	Boundary Hospital	0	0		Tested at Caro Lab
21-Aug-06	Valley Heights Booster	X	X	NEG	Tested in House
21-Aug-06	Market st Fountain	X	X	NEG	Tested in House
22-Aug-06	Valley Heights Booster	0	0		Tested at Caro Lab
22-Aug-06	Boundary Hospital	0	0		Tested at Caro Lab
29-Aug-06	Valley Heights Booster	0	0		Tested at Caro Lab
29-Aug-06	Market st Fountain	X	X	NEG	Tested in House
29-Aug-06	Donaldson Fountain	X	X	NEG	Tested in House
29-Aug-06	Boundary Hospital	0	0		Tested at Caro Lab
5-Sep-06	Valley Heights Booster	0	0		Tested at Caro Lab
5-Sep-06	Skate Park	X	X	NEG	Tested in House
5-Sep-06	Market st Fountain	X	X	NEG	Tested in House
5-Sep-06	Boundary Hospital	0	0		Tested at Caro Lab
11-Sep-06	Skate Park	X	X	NEG	Tested in House
11-Sep-06	Market st Fountain	X	X	NEG	Tested in House
12-Sep-06	Valley Heights Booster	0	0		Tested at Caro Lab
12-Sep-06	Boundary Hospital	0	0		Tested at Caro Lab
18-Sep-06	Skate Park	X	X	NEG	Tested in House
18-Sep-06	Market st Fountain	X	X	NEG	Tested in House
18-Sep-06	Firehall	X	X	NEG	Tested in House
19-Sep-06	Valley Heights Booster	0	0		Tested at Caro Lab
19-Sep-06	Boundary Hospital	0	0		Tested at Caro Lab
25-Sep-06	Skate Park	X	X	NEG	Tested in House
25-Sep-06	Market st Fountain	X	X	NEG	Tested in House
27-Sep-06	Valley Heights Booster	0	0		Tested at Caro Lab
27-Sep-06	Boundary Hospital	0	0		Tested at Caro Lab
2-Oct-06	City Hall	X	X	NEG	Tested in House
2-Oct-06	128 Victoria Way	X	X	NEG	Tested in House
3-Oct-06	Valley Heights Booster	< 1	< 1		Tested at Caro Lab
3-Oct-06	Boundary Hospital	< 1	< 1		Tested at Caro Lab
10-Oct-06	Valley Heights Booster	X	X	NEG	Tested in House
10-Oct-06	Valley Heights Booster	< 1	< 1		Tested at Caro Lab
10-Oct-06	City Hall	X	X	NEG	Tested in House
10-Oct-06	Boundary Hospital	< 1	< 1		Tested at Caro Lab
16-Oct-06	Valley Heights Booster	X	X	NEG	Tested in House
16-Oct-06	Firehall	X	X	POS/ NEG E COLI	Tested in House
18-Oct-06	Valley Heights Booster	< 1	< 1		Tested at Caro Lab
18-Oct-06	Firehall	X	X	POS/ NEG E COLI	Tested in House
18-Oct-06	Boundary Hospital	< 1	< 1		Tested at Caro Lab
19-Oct-06	City Hall	X	X	NEG	Tested in House
21-Oct-06	Firehall	X	X	NEG	Tested in House
23-Oct-06	Firehall	X	X	NEG	Tested in House
23-Oct-06	City Cemetery	X	X	NEG	Tested in House
24-Oct-06	Valley Heights Booster	< 1	< 1		Tested at Caro Lab
24-Oct-06	Boundary Hospital	< 1	< 1		Tested at Caro Lab
30-Oct-06	Valley Heights Booster	X	X	NEG	Tested in House
30-Oct-06	Firehall	X	X	NEG	Tested in House
31-Oct-06	Valley Heights Booster	< 1	< 1		Tested at Caro Lab
31-Oct-06	Boundary Hospital	< 1	< 1		Tested at Caro Lab
6-Nov-06	Valley Heights Booster	X	X	NEG	Tested in House
6-Nov-06	Valley Heights Booster	< 1	< 1		Tested at Caro Lab
6-Nov-06	City Hall	X	X	NEG	Tested in House
6-Nov-06	Boundary Hospital	< 1	< 1		Tested at Caro Lab
15-Nov-06	Valley Heights Booster	< 1	< 1		Tested at Caro Lab
15-Nov-06	East Zone Reservoir	X	X	NEG	Tested in House
15-Nov-06	East Zone Reservoir	< 1	< 1		Tested at Caro Lab
15-Nov-06	Boundary Hospital	< 1	< 1		Tested at Caro Lab
17-Nov-06	East Zone Reservoir	X	X	NEG	Tested in House
20-Nov-06	Valley Heights Booster	X	X	NEG	Tested in House
20-Nov-06	City Hall	X	X	NEG	Tested in House
21-Nov-06	Valley Heights Booster	< 1	< 1		Tested at Caro Lab
21-Nov-06	Boundary Hospital	< 1	< 1		Tested at Caro Lab
23-Nov-06	East Zone Reservoir	X	X	POS / no e coli	Tested in House
26-Nov-06	East Zone Reservoir	X	X	NEG	Tested in House
27-Nov-06	Valley Heights Booster	X	X	NEG	Tested in House
27-Nov-06	Firehall	X	X	NEG	Tested in House
28-Nov-06	Valley Heights Booster	< 1	< 1		Tested at Caro Lab
28-Nov-06	Boundary Hospital	< 1	< 1		Tested at Caro Lab
11-Dec-06	Firehall	X	X	NEG	Tested in House
12-Dec-06	Valley Heights Booster	< 1	< 1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
12-Dec-06	Boundary Hospital	< 1	< 1		Tested at Caro Lab
18-Dec-06	Valley Heights Booster	X	X	NEG	Tested in House
18-Dec-06	Hutton School	X	X	NEG	Tested in House
19-Dec-06	Valley Heights Booster	< 1	< 1		Tested at Caro Lab
19-Dec-06	Boundary Hospital	< 1	< 1		Tested at Caro Lab
27-Dec-06	Valley Heights Booster	< 1	< 1		Tested at Caro Lab
27-Dec-06	Boundary Hospital	< 1	< 1		Tested at Caro Lab
2-Jan-07	Valley Heights booster	<1	<1		Tested at Caro Lab
2-Jan-07	Fire Hall	X	X	NEG	Tested in House
2-Jan-07	Cemetary Office	X	X	NEG	Tested in House
2-Jan-07	Boundary Hospital	<1	<1		Tested at Caro Lab
8-Jan-07	Valley Heights booster	X	X	NEG	Tested in House
8-Jan-07	Hutton School	X	X	NEG	Tested in House
9-Jan-07	Valley Heights booster	<1	<1		Tested at Caro Lab
9-Jan-07	Boundary Hospital	<1	<1		Tested at Caro Lab
15-Jan-07	Valley Heights booster	X	X	NEG	Tested in House
15-Jan-07	Hutton School	X	X	NEG	Tested in House
16-Jan-07	Valley Heights booster	<1	<1		Tested at Caro Lab
16-Jan-07	Boundary Hospital	<1	<1		Tested at Caro Lab
22-Jan-07	Valley Heights booster	X	X	NEG	Tested in House
22-Jan-07	Aquatic Center	X	X	NEG	Tested in House
23-Jan-07	Valley Heights booster	<1	<1		Tested at Caro Lab
23-Jan-07	Boundary Hospital	<1	<1		Tested at Caro Lab
29-Jan-07	Valley Heights booster	X	X	NEG	Tested in House
29-Jan-07	Hutton School	X	X	NEG	Tested in House
30-Jan-07	Valley Heights booster	<1	<1		Tested at Caro Lab
30-Jan-07	Boundary Hospital	<1	<1		Tested at Caro Lab
5-Feb-07	Valley Heights booster	X	X	NEG	Tested in House
5-Feb-07	Cemetary Office	X	X	NEG	Tested in House
6-Feb-07	Valley Heights booster	<1	<1		Tested at Caro Lab
6-Feb-07	Boundary Hospital	<1	<1		Tested at Caro Lab
12-Feb-07	Valley Heights booster	X	X	NEG	Tested in House
12-Feb-07	Aquatic Center	X	X	NEG	Tested in House
14-Feb-07	Valley Heights booster	<1	<1		Tested at Caro Lab
14-Feb-07	Boundary Hospital	<1	<1		Tested at Caro Lab
19-Feb-07	Valley Heights booster	X	X	NEG	Tested in House
19-Feb-07	Aquatic Center	X	X	NEG	Tested in House
20-Feb-07	Valley Heights booster	<1	<1		Tested at Caro Lab
20-Feb-07	Boundary Hospital	<1	<1		Tested at Caro Lab
26-Feb-07	Valley Heights booster	X	X	NEG	Tested in House
26-Feb-07	Hutton School	X	X	NEG	Tested in House
27-Feb-07	Valley Heights booster	<1	<1		Tested at Caro Lab
27-Feb-07	Boundary Hospital	<1	<1		Tested at Caro Lab
5-Mar-07	Valley Heights booster	X	X	NEG	Tested in House
5-Mar-07	Aquatic Center	X	X	NEG	Tested in House
6-Mar-07	Valley Heights booster	<1	<1		Tested at Caro Lab
6-Mar-07	Boundary Hospital	<1	<1		Tested at Caro Lab
12-Mar-07	Hutton School	X	X	NEG	Tested in House
12-Mar-07	Valley Heights booster	<1	<1		Tested at Caro Lab
12-Mar-07	Boundary Hospital	<1	<1		Tested at Caro Lab
19-Mar-07	Valley Heights booster	X	X	NEG	Tested in House
19-Mar-07	Cemetary Office	X	X	NEG	Tested in House
20-Mar-07	Valley Heights booster	<1	<1		Tested at Caro Lab
20-Mar-07	Boundary Hospital	<1	<1		Tested at Caro Lab
29-Mar-07	Valley Heights booster	<1	<1		Tested at Caro Lab
29-Mar-07	Boundary Hospital	<1	<1		Tested at Caro Lab
2-Apr-07	Valley Heights booster	X	X	NEG	Tested in House
2-Apr-07	Hutton School	X	X	NEG	Tested in House
3-Apr-07	Valley Heights booster	<1	<1		Tested at Caro Lab
3-Apr-07	Boundary Hospital	<1	<1		Tested at Caro Lab
10-Apr-07	Valley Heights booster	X	X	NEG	Tested in House
10-Apr-07	Skate Park Fountain	X	X	NEG	Tested in House
12-Apr-07	Valley Heights booster	<1	<1		Tested at Caro Lab
12-Apr-07	Boundary Hospital	<1	<1		Tested at Caro Lab
16-Apr-07	Valley Heights booster	X	X	NEG	Tested in House
16-Apr-07	Skate Park Fountain	X	X	NEG	Tested in House
17-Apr-07	Valley Heights booster	<1	<1		Tested at Caro Lab
17-Apr-07	Boundary Hospital	<1	<1		Tested at Caro Lab
23-Apr-07	Valley Heights booster	POS	NEG	POS	Tested in House
24-Apr-07	Valley Heights booster	<1	<1		Tested at Caro Lab
24-Apr-07	Skate Park Fountain	X	X	NEG	Tested in House
24-Apr-07	Boundary Hospital	<1	<1		Tested at Caro Lab
25-Apr-07	Valley Heights booster	X	X	NEG	Tested in House
25-Apr-07	Fire Hall	X	X	NEG	Tested in House
30-Apr-07	Valley Heights booster	POS	NEG	POS	Tested in House
30-Apr-07	Skate Park Fountain	X	X	NEG	Tested in House
1-May-07	Valley Heights booster	POS	NEG		Tested in House
1-May-07	128 Victoria Way	POS	NEG		Tested in House
1-May-07	Valley Heights booster	<1	<1		Tested at Caro Lab
1-May-07	Boundary Hospital	<1	<1		Tested at Caro Lab
2-May-07	Victoria Way	POS	NEG		Tested in House
2-May-07	Fire Hall	POS	NEG		Tested in House
2-May-07	East Zone Reservoir	POS	NEG		Tested in House

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
2-May-07	Valley Heights booster	X	X	NEG	Tested in House
2-May-07	High Zone Reservoir	X	X		Tested in House
3-May-07	Victoria Way	POS	NEG		Tested in House
3-May-07	East Zone Reservoir	POS	NEG		Tested in House
3-May-07	East Zone Reservoir	POS	NEG		Tested in House
3-May-07	Well 3A	X	X	NEG	Tested in House
3-May-07	Well 2	X	X	NEG	Tested in House
3-May-07	Valley Heights booster	X	X	NEG	Tested in House
3-May-07	Skate Park Fountain	X	X	NEG	Tested in House
3-May-07	High Zone Reservoir	X	X	NEG	Tested in House
3-May-07	Fire Hall	X	X	NEG	Tested in House
3-May-07	East Zone Reservoir	< 3.0	<3.0		Tested at Caro Lab
4-May-07	East Zone Reservoir	POS	NEG		Tested in House
4-May-07	Valley Heights booster	X	X	NEG	Tested in House
4-May-07	Fire Hall	X	X	NEG	Tested in House
7-May-07	Well 3	X	X	NEG	Tested in House
7-May-07	Victoria Way	X	X	NEG	Tested in House
7-May-07	Valley Heights booster	X	X	NEG	Tested in House
7-May-07	City Hall	X	X	NEG	Tested in House
9-May-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
10-May-07	Victoria Way	X	X	NEG	Tested in House
10-May-07	Valley Heights booster	<1	<1		Tested at Caro Lab
10-May-07	Valley Heights booster	X	X	NEG	Tested in House
10-May-07	Skate Park Fountain	X	X	NEG	Tested in House
10-May-07	Hutton School	X	X	NEG	Tested in House
10-May-07	East Zone Reservoir	X	X	NEG	Tested in House
10-May-07	City Hall	X	X	NEG	Tested in House
10-May-07	Cemetery Office	X	X	NEG	Tested in House
10-May-07	Boundary Hospital	<1	<1		Tested at Caro Lab
13-May-07	East Zone Reservoir	25	<1		Tested at Caro Lab
14-May-07	Valley Heights booster	X	X	NEG	Tested in House
14-May-07	Fire Hall	X	X	NEG	Tested in House
14-May-07	City Hall	X	X	NEG	Tested in House
14-May-07	Cemetery Office	X	X	NEG	Tested in House
14-May-07	1524 77th ave	X	X	NEG	Tested in House
15-May-07	Valley Heights booster	<1	<1		Tested at Caro Lab
15-May-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
15-May-07	Boundary Hospital	<1	<1		Tested at Caro Lab
22-May-07	Valley Heights booster	X	X	NEG	Tested in House
22-May-07	Valley Heights booster	<1	<1		Tested at Caro Lab
22-May-07	Fire Hall	X	X	NEG	Tested in House
22-May-07	Fire Hall	<1	<1		Tested at Caro Lab
22-May-07	Cemetery Office	X	X	NEG	Tested in House
22-May-07	Boundary Hospital	<1	<1		Tested at Caro Lab
22-May-07	1524 77th ave	X	X	NEG	Tested in House
24-May-07	East Zone Reservoir	POS	NEG		Tested in House
27-May-07	East Zone Reservoir	POS	NEG		Tested in House
27-May-07	East Zone Reservoir	<1	<1	background >200	Tested at Caro Lab
27-May-07	East Zone Reservoir	<1	<1	background >200	Tested at Caro Lab
28-May-07	Works Yard	<1	<1		Tested at Caro Lab
28-May-07	Valley Heights booster	X	X	NEG	Tested in House
28-May-07	Skate Park Fountain	X	X	NEG	Tested in House
28-May-07	Highschool	<1	<1		Tested at Caro Lab
28-May-07	Fire Hall	<1	<1		Tested at Caro Lab
28-May-07	City Hall	X	X	NEG	Tested in House
28-May-07	Cemetery Office	<1	<1		Tested at Caro Lab
28-May-07	243 winnipeg ave.	X	X	NEG	Tested in House
29-May-07	Valley Heights booster	<1	<1		Tested at Caro Lab
29-May-07	Boundary Hospital	<1	<1		Tested at Caro Lab
30-May-07	Well 5	<1	<1		Tested at Caro Lab
30-May-07	Well 3A	<1	<1		Tested at Caro Lab
30-May-07	Well 3	<1	<1		Tested at Caro Lab
30-May-07	Well 2	<1	<1		Tested at Caro Lab
30-May-07	Valley Heights booster 2	<1	<1		Tested at Caro Lab
30-May-07	Valley Heights booster 1	<1	<1		Tested at Caro Lab
30-May-07	Reservoir Hatch 2	X	X	NEG	Tested in House
30-May-07	Reservoir Hatch 2	<1	<1		Tested at Caro Lab
30-May-07	Reservoir Hatch 1	X	X	NEG	Tested in House
30-May-07	Reservoir Hatch 1	<1	<1		Tested at Caro Lab
30-May-07	Reservoir Drain 2	<1	<1		Tested at Caro Lab
30-May-07	Reservoir Drain 1	<1	<1		Tested at Caro Lab
31-May-07	Reservoir Hatch 1	<1	<1		Tested at Caro Lab
31-May-07	Reservoir Drain 1	<1	<1		Tested at Caro Lab
31-May-07	Airport Terminal	<1	<1		Tested at Caro Lab
31-May-07	8515 Riverside	<1	<1		Tested at Caro Lab
31-May-07	7816 Donaldson	<1	<1		Tested at Caro Lab
31-May-07	761 76th Ave.	<1	<1		Tested at Caro Lab
31-May-07	6435 9th St.	<1	<1		Tested at Caro Lab
31-May-07	6045 19th St.	<1	<1		Tested at Caro Lab
4-Jun-07	Flames Restaurant	X	X	NEG	Tested in House
4-Jun-07	Fire Hall	X	X	NEG	Tested in House
4-Jun-07	East Zone Reservoir	X	X	NEG	Tested in House
4-Jun-07	City park tot lot	X	X	NEG	Tested in House

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
6-Jun-07	Valley Heights booster	<1	<1		Tested at Caro Lab
6-Jun-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
6-Jun-07	East Zone Reservoir	X	X	NEG	Tested in House
6-Jun-07	Boundary Hospital	<1	<1		Tested at Caro Lab
8-Jun-07	East Zone Reservoir	X	X	NEG	Tested in House
12-Jun-07	East Zone Reservoir	POS	NEG		Tested in House
12-Jun-07	Well 3A	X	X	NEG	Tested in House
12-Jun-07	Valley Heights booster	X	X	NEG	Tested in House
12-Jun-07	Valley Heights booster	<1	<1		Tested at Caro Lab
12-Jun-07	Skate Park Fountain	X	X	NEG	Tested in House
12-Jun-07	East Zone Reservoir	<1	<1	background >200	Tested at Caro Lab
12-Jun-07	Boundary Hospital	<1	<1		Tested at Caro Lab
13-Jun-07	Reservoir standpipe	POS	NEG		Tested in House
13-Jun-07	East Zone Reservoir	POS	NEG		Tested in House
14-Jun-07	East Zone Reservoir	POS	NEG		Tested in House
14-Jun-07	East Zone Reservoir 2	<1	<1	background >200	Tested at Caro Lab
14-Jun-07	East Zone Reservoir 1	<1	<1	background >200	Tested at Caro Lab
17-Jun-07	East Zone Reservoir 2	<1	<1		Tested at Caro Lab
17-Jun-07	East Zone Reservoir 1	<1	<1		Tested at Caro Lab
17-Jun-07	East Zone Reservoir	X	X	NEG	Tested in House
18-Jun-07	Perley School	X	X	NEG	Tested in House
18-Jun-07	Fire Hall	X	X	NEG	Tested in House
18-Jun-07	East Zone Reservoir	X	X	NEG	Tested in House
19-Jun-07	Valley Heights booster	<1	<1		Tested at Caro Lab
19-Jun-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
19-Jun-07	Boundary Hospital	<1	<1		Tested at Caro Lab
21-Jun-07	Valley Heights booster	X	X	NEG	Tested in House
21-Jun-07	East Zone Reservoir	X	X	NEG	Tested in House
25-Jun-07	East Zone Reservoir	POS	NEG		Tested in House
25-Jun-07	Hutton School	X	X	NEG	Tested in House
25-Jun-07	City Hall	X	X	NEG	Tested in House
26-Jun-07	East Zone Reservoir	POS	NEG		Tested in House
26-Jun-07	Valley Heights booster	<1	<1	background >200	Tested at Caro Lab
26-Jun-07	East Zone Reservoir	<1	<1	background >200	Tested at Caro Lab
26-Jun-07	Boundary Hospital	<1	<1		Tested at Caro Lab
27-Jun-07	Reservoir standpipe2	POS	NEG		Tested in House
27-Jun-07	East Zone Reservoir	POS	NEG		Tested in House
27-Jun-07	Well 3A	X	X	NEG	Tested in House
27-Jun-07	Well 3	X	X	NEG	Tested in House
27-Jun-07	Well 2	X	X	NEG	Tested in House
27-Jun-07	Skate Park Fountain	X	X	NEG	Tested in House
27-Jun-07	Reservoir standpipe1	X	X	NEG	Tested in House
27-Jun-07	Omega Restaurant	X	X	NEG	Tested in House
27-Jun-07	Fire Hall	X	X	NEG	Tested in House
27-Jun-07	Cemetery Office	X	X	NEG	Tested in House
28-Jun-07	East Zone Reservoir 2	X	X	NEG	Tested in House
28-Jun-07	East Zone Reservoir 1	X	X	NEG	Tested in House
29-Jun-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
29-Jun-07	East Zone Reservoir	X	X	NEG	Tested in House
30-Jun-07	East Zone Reservoir 2	X	X	NEG	Tested in House
30-Jun-07	East Zone Reservoir 1	X	X	NEG	Tested in House
1-Jul-07	East Zone Reservoir 2	X	X	NEG	Tested in House
1-Jul-07	East Zone Reservoir 1	X	X	NEG	Tested in House
2-Jul-07	East Zone Reservoir 2	X	X	NEG	Tested in House
2-Jul-07	East Zone Reservoir 1	X	X	NEG	Tested in House
3-Jul-07	Valley Heights booster	X	X	NEG	Tested in House
3-Jul-07	Skate Park Fountain	X	X	NEG	Tested in House
3-Jul-07	Fire Hall	X	X	NEG	Tested in House
3-Jul-07	East Zone Reservoir	X	X	NEG	Tested in House
4-Jul-07	East Zone Reservoir	X	X	NEG	Tested in House
5-Jul-07	East Zone Reservoir	X	X	NEG	Tested in House
6-Jul-07	East Zone Reservoir	POS	NEG		Tested in House
6-Jul-07	East Zone Reservoir 1	POS	NEG		Tested in House
7-Jul-07	East Zone Reservoir 2	POS	NEG		Tested in House
7-Jul-07	East Zone Reservoir 2	POS	NEG		Tested in House
8-Jul-07	East Zone Reservoir 1	X	X	NEG	Tested in House
9-Jul-07	Valley Heights booster	<1	<1		Tested at Caro Lab
9-Jul-07	Skate Park Fountain	X	X	NEG	Tested in House
9-Jul-07	Reservoir standpipe1	<1	<1		Tested at Caro Lab
9-Jul-07	Fire Hall	X	X	NEG	Tested in House
9-Jul-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
9-Jul-07	East Zone Reservoir	X	X	NEG	Tested in House
9-Jul-07	Boundary Hospital	<1	<1		Tested at Caro Lab
10-Jul-07	East Zone Reservoir	X	X	NEG	Tested in House
11-Jul-07	East Zone Reservoir	X	X	NEG	Tested in House
16-Jul-07	Fire Hall	POS	NEG		Tested in House
16-Jul-07	East Zone Reservoir	POS	NEG		Tested in House
16-Jul-07	Skate Park Fountain	X	X	NEG	Tested in House
17-Jul-07	Reservoir standpipe1	POS	NEG		Tested in House
17-Jul-07	East Zone Reservoir	POS	NEG		Tested in House
17-Jul-07	Valley Heights booster	<1	<1		Tested at Caro Lab
17-Jul-07	Reservoir standpipe1	<1	<1		Tested at Caro Lab
17-Jul-07	East Zone Reservoir	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
17-Jul-07	Boundary Hospital	<1	<1		Tested at Caro Lab
18-Jul-07	Valley Heights booster	POS	NEG		Tested in House
18-Jul-07	Reservoir standpipe	POS	NEG		Tested in House
18-Jul-07	Fire Hall	X	X	NEG	Tested in House
18-Jul-07	East Zone Reservoir	X	X	NEG	Tested in House
19-Jul-07	East Zone Reservoir	POS	NEG		Tested in House
19-Jul-07	Valley Heights booster	X	X	NEG	Tested in House
19-Jul-07	Reservoir standpipe	X	X	NEG	Tested in House
19-Jul-07	High Zone Reservoir	X	X	NEG	Tested in House
23-Jul-07	High Zone Reservoir	POS	NEG		Tested in House
23-Jul-07	East Zone Reservoir	POS	POS		Tested in House
23-Jul-07	East Zone Reservoir	6	5		Tested at Caro Lab
23-Jul-07	Skate Park Fountain	X	X	NEG	Tested in House
23-Jul-07	Fire Hall	X	X	NEG	Tested in House
24-Jul-07	East Zone Reservoir	3	1		Tested at Caro Lab
24-Jul-07	Well 5	<1	<1		Tested at Caro Lab
24-Jul-07	Well 3A	<1	<1		Tested at Caro Lab
24-Jul-07	Valley Heights booster	<1	<1		Tested at Caro Lab
24-Jul-07	Fire Hall	<1	<1		Tested at Caro Lab
24-Jul-07	Boundary Hospital	<1	<1		Tested at Caro Lab
25-Jul-07	Well 5	<1	<1		Tested at Caro Lab
25-Jul-07	Well 2	<1	<1		Tested at Caro Lab
25-Jul-07	High Zone Reservoir	<1	<1		Tested at Caro Lab
25-Jul-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
26-Jul-07	Works Yard	<1	<1		Tested at Caro Lab
26-Jul-07	well 4	X	X	NEG	Tested in House
26-Jul-07	Well 4	X	X	NEG	Tested in House
26-Jul-07	Well 3	<1	<1		Tested at Caro Lab
26-Jul-07	Valmar Liftstation	<1	<1		Tested at Caro Lab
26-Jul-07	Valley Heights booster	X	X	NEG	Tested in House
26-Jul-07	Valley Heights booster	<1	<1		Tested at Caro Lab
26-Jul-07	Skate Park Fountain	<1	<1		Tested at Caro Lab
26-Jul-07	Pressure Relief	<1	<1		Tested at Caro Lab
26-Jul-07	Perley School Annex	<1	<1		Tested at Caro Lab
26-Jul-07	Overwaitea Foods	<1	<1		Tested at Caro Lab
26-Jul-07	High Zone Reservoir	X	X	NEG	Tested in House
26-Jul-07	High Zone Reservoir	<1	<1		Tested at Caro Lab
26-Jul-07	Granby Liftstation	X	X	NEG	Tested in House
26-Jul-07	Firehall	<1	<1		Tested at Caro Lab
26-Jul-07	Extra Foods	<1	<1		Tested at Caro Lab
26-Jul-07	East Zone Reservoir	X	X	NEG	Tested in House
26-Jul-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
26-Jul-07	City Hall	<1	<1		Tested at Caro Lab
26-Jul-07	Cemetery	<1	<1		Tested at Caro Lab
26-Jul-07	Buy Low Foods	<1	<1		Tested at Caro Lab
26-Jul-07	Airport Terminal	<1	<1		Tested at Caro Lab
26-Jul-07	8515 Riverside Dr.	<1	<1		Tested at Caro Lab
26-Jul-07	1524 77th Ave.	<1	<1		Tested at Caro Lab
27-Jul-07	Valley Heights booster	X	X	NEG	Tested in House
27-Jul-07	P & T Office	X	X	NEG	Tested in House
27-Jul-07	High Zone Reservoir	X	X	NEG	Tested in House
27-Jul-07	East Zone Reservoir	X	X	NEG	Tested in House
27-Jul-07	Boundary Lodge	X	X	NEG	Tested in House
27-Jul-07	7715 22nd St.	X	X	NEG	Tested in House
27-Jul-07	6435 9th St.	X	X	NEG	Tested in House
27-Jul-07	6144 12th St.	X	X	NEG	Tested in House
27-Jul-07	2240 Selkirk Pl.	X	X	NEG	Tested in House
28-Jul-07	High Zone Reservoir	X	X	NEG	Tested in House
28-Jul-07	East Zone Reservoir	X	X	NEG	Tested in House
29-Jul-07	Valley Heights booster	X	X	NEG	Tested in House
29-Jul-07	Fire Hall	X	X	NEG	Tested in House
29-Jul-07	East Zone Reservoir	X	X	NEG	Tested in House
29-Jul-07	Donaldson Park	X	X	NEG	Tested in House
29-Jul-07	Burroughs Residence	X	X	NEG	Tested in House
30-Jul-07	Valley Heights booster	<1	<1		Tested at Caro Lab
30-Jul-07	V H Booster	X	X	NEG	Tested in House
30-Jul-07	Sands Condos	X	X	NEG	Tested in House
30-Jul-07	Roxul	X	X	NEG	Tested in House
30-Jul-07	High Zone Reservoir	<1	<1		Tested at Caro Lab
30-Jul-07	High Zone Reservoir	X	X	NEG	Tested in House
30-Jul-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
30-Jul-07	East Zone Reservoir	X	X	NEG	Tested in House
30-Jul-07	7549 11th St.	X	X	NEG	Tested in House
30-Jul-07	6369 12th St.	X	X	NEG	Tested in House
30-Jul-07	6008 18th St.	X	X	NEG	Tested in House
31-Jul-07	Well 5	<1	<1		Tested at Caro Lab
31-Jul-07	Well 3A	<1	<1		Tested at Caro Lab
31-Jul-07	Well 3	<1	<1		Tested at Caro Lab
31-Jul-07	Well 2	<1	<1		Tested at Caro Lab
31-Jul-07	V H Booster	<1	<1		Tested at Caro Lab
31-Jul-07	Super Save Gas	X	X	NEG	Tested in House
31-Jul-07	Fire Hall	X	X	NEG	Tested in House
31-Jul-07	East Zone Reservoir	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
31-Jul-07	Burroughs Residence	<1	<1		Tested at Caro Lab
31-Jul-07	Boundary Lodge	X	X	NEG	Tested in House
31-Jul-07	Boundary Hospital	<1	<1		Tested at Caro Lab
1-Aug-07	V H Booster	X	X	NEG	Tested in House
1-Aug-07	Riverside (Noseworthy's)	X	X	NEG	Tested in House
1-Aug-07	High Zone Reservoir	X	X	NEG	Tested in House
1-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
1-Aug-07	Can Par Lunch Room	X	X	NEG	Tested in House
1-Aug-07	780 65th Ave.	X	X	NEG	Tested in House
1-Aug-07	7295 Sunshine Way	X	X	NEG	Tested in House
2-Aug-07	V H Booster	X	X	NEG	Tested in House
2-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
2-Aug-07	7253 7th St.	X	X	NEG	Tested in House
2-Aug-07	6854 1st St.	X	X	NEG	Tested in House
2-Aug-07	6773 14th St.	X	X	NEG	Tested in House
2-Aug-07	1381 71st Ave.	X	X	NEG	Tested in House
3-Aug-07	FireHall	X	X	NEG	Tested in House
3-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
3-Aug-07	Boundary Hospital	X	X	NEG	Tested in House
3-Aug-07	7498 Valley Heights Dr.	X	X	NEG	Tested in House
4-Aug-07	V H Booster	X	X	NEG	Tested in House
4-Aug-07	Petro Canada	X	X	NEG	Tested in House
4-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
5-Aug-07	V H Booster	X	X	NEG	Tested in House
5-Aug-07	High Zone Reservoir	X	X	NEG	Tested in House
5-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
5-Aug-07	Black Knight Market	X	X	NEG	Tested in House
6-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
6-Aug-07	V H Booster	X	X	NEG	Tested in House
6-Aug-07	Shell Station	X	X	NEG	Tested in House
6-Aug-07	Public Works	X	X	NEG	Tested in House
6-Aug-07	Petro Canada	<1	<1		Tested at Caro Lab
6-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
6-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
6-Aug-07	Cemetery	<1	<1		Tested at Caro Lab
7-Aug-07	B C Liquor Store	POS	NEG		Tested in House
7-Aug-07	Well 5	X	X	NEG	Tested in House
7-Aug-07	Well 3A	<1	<1		Tested at Caro Lab
7-Aug-07	Well 3	<1	<1		Tested at Caro Lab
7-Aug-07	Well 2	X	X	NEG	Tested in House
7-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
7-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
7-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
7-Aug-07	Cemetery	X	X	NEG	Tested in House
7-Aug-07	Boundary Hospital	<1	<1		Tested at Caro Lab
7-Aug-07	7971 19th (Valmar)	X	X	NEG	Tested in House
7-Aug-07	740 65th Ave.	X	X	NEG	Tested in House
8-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
8-Aug-07	V H Booster	X	X	NEG	Tested in House
8-Aug-07	Overwaita Foods	X	X	NEG	Tested in House
8-Aug-07	G F Optical	X	X	NEG	Tested in House
8-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
8-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
8-Aug-07	Curves	X	X	NEG	Tested in House
8-Aug-07	Cemetery	<1	<1		Tested at Caro Lab
8-Aug-07	B C Liquor Store	<1	<1		Tested at Caro Lab
8-Aug-07	B C Liquor Store	X	X	NEG	Tested in House
8-Aug-07	1659 Lansdown Cr.	X	X	NEG	Tested in House
9-Aug-07	V H Booster	X	X	NEG	Tested in House
9-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
9-Aug-07	City Hall	X	X	NEG	Tested in House
9-Aug-07	B C Liquor Store	X	X	NEG	Tested in House
10-Aug-07	West End Store	X	X	NEG	Tested in House
10-Aug-07	Water Cooler GF C Union	X	X	NEG	Tested in House
10-Aug-07	V H Booster	X	X	NEG	Tested in House
10-Aug-07	G F Funeral Home	X	X	NEG	Tested in House
10-Aug-07	G F Credit Union	X	X	NEG	Tested in House
10-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
10-Aug-07	Abbyfield House	X	X	NEG	Tested in House
11-Aug-07	V H Booster	X	X	NEG	Tested in House
11-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
12-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
12-Aug-07	V H Booster	X	X	NEG	Tested in House
12-Aug-07	Shell Station	<1	<1		Tested at Caro Lab
12-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
12-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
12-Aug-07	Cemetery	<1	<1		Tested at Caro Lab
12-Aug-07	7434 Valley Heights	<1	<1		Tested at Caro Lab
13-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
13-Aug-07	V H Booster	X	X	NEG	Tested in House
13-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
13-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
13-Aug-07	7524 77th Ave.	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
13-Aug-07	7320 9th St.	<1	<1		Tested at Caro Lab
14-Aug-07	Well 3A	X	X	NEG	Tested in House
14-Aug-07	Well 3	X	X	NEG	Tested in House
14-Aug-07	V H Booster	X	X	NEG	Tested in House
14-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
14-Aug-07	6026 12th St.	X	X	NEG	Tested in House
14-Aug-07	1724 66th Ave.	X	X	NEG	Tested in House
15-Aug-07	Water Cooler GF C Union	X	X	NEG	Tested in House
15-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
15-Aug-07	V H Booster	X	X	NEG	Tested in House
15-Aug-07	Fire Hall	<1	<1		Tested at Caro Lab
15-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
15-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
15-Aug-07	Credit Union	<1	<1		Tested at Caro Lab
15-Aug-07	City Hall	X	X	NEG	Tested in House
16-Aug-07	V H Booster	X	X	NEG	Tested in House
16-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
16-Aug-07	Lenny's 16th St.	<1	<1		Tested at Caro Lab
16-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
16-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
16-Aug-07	Curling Rink	X	X	NEG	Tested in House
16-Aug-07	Barbra Anne Park	X	X	NEG	Tested in House
16-Aug-07	B&F Sales	<1	<1		Tested at Caro Lab
17-Aug-07	Works Yard	X	X	NEG	Tested in House
17-Aug-07	V H Booster	X	X	NEG	Tested in House
17-Aug-07	Super save Gas	X	X	NEG	Tested in House
17-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
18-Aug-07	V H Booster	X	X	NEG	Tested in House
18-Aug-07	SPCA	X	X	NEG	Tested in House
18-Aug-07	Petro Canada	X	X	NEG	Tested in House
18-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
19-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
19-Aug-07	V H Booster	X	X	NEG	Tested in House
19-Aug-07	Shell Station	<1	<1		Tested at Caro Lab
19-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
19-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
19-Aug-07	Cemetery	<1	<1		Tested at Caro Lab
20-Aug-07	V H Booster	X	X	NEG	Tested in House
20-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
20-Aug-07	Omega II	<1	<1		Tested at Caro Lab
20-Aug-07	FireHall	X	X	NEG	Tested in House
20-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
20-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
20-Aug-07	7320 9th St.	X	X	NEG	Tested in House
20-Aug-07	6908 17th St	<1	<1		Tested at Caro Lab
21-Aug-07	V H Booster	X	X	NEG	Tested in House
21-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
21-Aug-07	Kal Tire	<1	<1		Tested at Caro Lab
21-Aug-07	HighZone Reservoir	X	X	NEG	Tested in House
21-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
21-Aug-07	Boundary Hospital	<1	<1		Tested at Caro Lab
22-Aug-07	Well 2	POS	NEG	POS	Tested in House
22-Aug-07	Wildlife Hall	X	X	NEG	Tested in House
22-Aug-07	Well 5	X	X	NEG	Tested in House
22-Aug-07	V H Booster	X	X	NEG	Tested in House
22-Aug-07	East Zone Reservoir	X	X	NEG	Tested in House
23-Aug-07	Well 2	NEG	NEG	NEG	Tested in House
23-Aug-07	V H Booster	NEG	NEG	NEG	Tested in House
23-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
23-Aug-07	Lordco	NEG	NEG	NEG	Tested in House
23-Aug-07	Lordco	<1	<1		Tested at Caro Lab
23-Aug-07	East Zone Reservoir	NEG	NEG	NEG	Tested in House
23-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Aug-07	Dick Bartlett Park	NEG	NEG	NEG	Tested in House
23-Aug-07	Dick Bartlett Park	<1	<1		Tested at Caro Lab
27-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
27-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
27-Aug-07	BMX Concession	<1	<1		Tested at Caro Lab
27-Aug-07	Arena	<1	<1		Tested at Caro Lab
28-Aug-07	Well5	<1	<1		Tested at Caro Lab
28-Aug-07	Well 3A	NEG	NEG	NEG	Tested in House
28-Aug-07	Well 3	NEG	NEG	NEG	Tested in House
28-Aug-07	Well 2	<1	<1		Tested at Caro Lab
28-Aug-07	V H Booster	NEG	NEG	NEG	Tested in House
28-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
28-Aug-07	East Zone Reservoir	NEG	NEG	NEG	Tested in House
28-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
28-Aug-07	Boundary Lodge	NEG	NEG	NEG	Tested in House
28-Aug-07	Boundary Hospital	<1	<1		Tested at Caro Lab
29-Aug-07	V H Booster	NEG	NEG	NEG	Tested in House
29-Aug-07	Liquor Store	NEG	NEG	NEG	Tested in House
29-Aug-07	East Zone Reservoir	NEG	NEG	NEG	Tested in House
29-Aug-07	6947 17th St.	NEG	NEG	NEG	Tested in House

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
30-Aug-07	Well 2	NEG	NEG	NEG	Tested in House
30-Aug-07	V H Booster	<1	<1		Tested at Caro Lab
30-Aug-07	V H Booster	NEG	NEG	NEG	Tested in House
30-Aug-07	PRV Station	NEG	NEG	NEG	Tested in House
30-Aug-07	FireHall	<1	<1		Tested at Caro Lab
30-Aug-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
30-Aug-07	East Zone Reservoir	NEG	NEG	NEG	Tested in House
31-Aug-07	V H Booster	NEG	NEG	NEG	Tested in House
31-Aug-07	East Zone Reservoir	NEG	NEG	NEG	Tested in House
31-Aug-07	City Hall	NEG	NEG	NEG	Tested in House
31-Aug-07	ABH Car Sales	NEG	NEG	NEG	Tested in House
31-Aug-07	ABH Car Sales	NEG	NEG	NEG	Tested in House
31-Aug-07	7466 Valley Heights	NEG	NEG	NEG	Tested in House
1-Sep-07	V H Booster	NEG	NEG	NEG	Tested in House
1-Sep-07	East Zone Reservoir	NEG	NEG	NEG	Tested in House
2-Sep-07	V H Booster	NEG	NEG	NEG	Tested in House
2-Sep-07	East Zone Reservoir	NEG	NEG	NEG	Tested in House
2-Sep-07	125 Victoria Way	NEG	NEG	NEG	Tested in House
3-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
3-Sep-07	V H Booster	NEG	NEG	NEG	Tested in House
3-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
3-Sep-07	East Zone Reservoir	NEG	NEG	NEG	Tested in House
3-Sep-07	Cemetery	<1	<1		Tested at Caro Lab
3-Sep-07	Cemetery	NEG	NEG	NEG	Tested in House
4-Sep-07	Well 5	X	X	NEG	Tested in House
4-Sep-07	Well 3A	<1	<1		Tested at Caro Lab
4-Sep-07	Well 3	<1	<1		Tested at Caro Lab
4-Sep-07	Well 2	X	X	NEG	Tested in House
4-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
4-Sep-07	V H Booster	X	X	NEG	Tested in House
4-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
4-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
4-Sep-07	Boundary Hospital	<1	<1		Tested at Caro Lab
4-Sep-07	Boundary Hospital	X	X	NEG	Tested in House
5-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
5-Sep-07	V H Booster	X	X	NEG	Tested in House
5-Sep-07	RCMP Station	<1	<1		Tested at Caro Lab
5-Sep-07	RCMP Station	X	X	NEG	Tested in House
5-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
5-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
5-Sep-07	696 64th Ave.	<1	<1		Tested at Caro Lab
5-Sep-07	696 64th Ave.	X	X	NEG	Tested in House
6-Sep-07	Well4	<1	<1		Tested at Caro Lab
6-Sep-07	Well4	X	X	NEG	Tested in House
6-Sep-07	Well 5	<1	<1		Tested at Caro Lab
6-Sep-07	Well 5	X	X	NEG	Tested in House
6-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
6-Sep-07	V H Booster	X	X	NEG	Tested in House
6-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
6-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
7-Sep-07	V H Booster	X	X	NEG	Tested in House
7-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
8-Sep-07	V H Booster	X	X	NEG	Tested in House
8-Sep-07	Fire Hall	X	X	NEG	Tested in House
8-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
8-Sep-07	Cemetery	X	X	NEG	Tested in House
9-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
9-Sep-07	V H Booster	X	X	NEG	Tested in House
9-Sep-07	Super Save Gas	<1	<1		Tested at Caro Lab
9-Sep-07	Super Save Gas	X	X	NEG	Tested in House
9-Sep-07	Petro Canada	<1	<1		Tested at Caro Lab
9-Sep-07	Petro Canada	X	X	NEG	Tested in House
9-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
9-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
10-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
10-Sep-07	V H Booster	X	X	NEG	Tested in House
10-Sep-07	Joga's Coffee Market St.	X	X	NEG	Tested in House
10-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
10-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
10-Sep-07	Angus McDonald Park	X	X	NEG	Tested in House
11-Sep-07	Well 5	<1	<1		Tested at Caro Lab
11-Sep-07	Well 3A	X	X	NEG	Tested in House
11-Sep-07	Well 3	X	X	NEG	Tested in House
11-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
11-Sep-07	V H Booster	X	X	NEG	Tested in House
11-Sep-07	Pope & Talbot	X	X	NEG	Tested in House
11-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
11-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
11-Sep-07	Can Par	X	X	NEG	Tested in House
11-Sep-07	Boundary Hospital	<1	<1		Tested at Caro Lab
11-Sep-07	129 Victoria Way (VH)	X	X	NEG	Tested in House
13-Sep-07	V H Booster	X	X	NEG	Tested in House
13-Sep-07	Overwaitea	X	X	NEG	Tested in House

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
13-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
13-Sep-07	Boundary Lodge	X	X	NEG	Tested in House
13-Sep-07	1270 59th Ave.	X	X	NEG	Tested in House
14-Sep-07	V H Booster	X	X	NEG	Tested in House
14-Sep-07	Hardy View Lodge	X	X	NEG	Tested in House
14-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
14-Sep-07	7320 9th St.	X	X	NEG	Tested in House
15-Sep-07	V H Booster	X	X	NEG	Tested in House
15-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
16-Sep-07	Works Yard	<1	<1		Tested at Caro Lab
16-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
16-Sep-07	V H Booster	X	X	NEG	Tested in House
16-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
16-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
16-Sep-07	Black Knight Market	<1	<1		Tested at Caro Lab
17-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
17-Sep-07	V H Booster	X	X	NEG	Tested in House
17-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
17-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
17-Sep-07	City Hall	X	X	NEG	Tested in House
17-Sep-07	7496 Valley Heights	<1	<1		Tested at Caro Lab
18-Sep-07	Well 5	X	X	NEG	Tested in House
18-Sep-07	Well 3A	<1	<1		Tested at Caro Lab
18-Sep-07	Well 3	<1	<1		Tested at Caro Lab
18-Sep-07	V H Booster	X	X	NEG	Tested in House
18-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
18-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
18-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
18-Sep-07	Boundary Hospital	<1	<1		Tested at Caro Lab
19-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
19-Sep-07	Hutton School	X	X	NEG	Tested in House
19-Sep-07	Glanville Center	X	X	NEG	Tested in House
19-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
19-Sep-07	Bon Air Motel	<1	<1		Tested at Caro Lab
19-Sep-07	Bon Air Motel	X	X	NEG	Tested in House
20-Sep-07	V H Booster	X	X	NEG	Tested in House
20-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
21-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
21-Sep-07	V H Booster	X	X	NEG	Tested in House
21-Sep-07	GF Arena	X	X	NEG	Tested in House
21-Sep-07	Fire Hall	X	X	NEG	Tested in House
21-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
21-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
21-Sep-07	V H Booster	X	X	NEG	Tested in House
21-Sep-07	Fire Hall	X	X	NEG	Tested in House
21-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
21-Sep-07	6435 9th St.	X	X	NEG	Tested in House
22-Sep-07	V H Booster	X	X	NEG	Tested in House
22-Sep-07	Subway	X	X	NEG	Tested in House
22-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
23-Sep-07	Well 3	<1	<1		Tested at Caro Lab
23-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
23-Sep-07	V H Booster	X	X	NEG	Tested in House
23-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
24-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
24-Sep-07	V H Booster	X	X	NEG	Tested in House
24-Sep-07	Roxul	X	X	NEG	Tested in House
24-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
24-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
24-Sep-07	225 Wellington Cres.	<1	<1		Tested at Caro Lab
25-Sep-07	Well 5	<1	<1		Tested at Caro Lab
25-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
25-Sep-07	V H Booster	X	X	NEG	Tested in House
25-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
25-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
25-Sep-07	Boundary Hospital	<1	<1		Tested at Caro Lab
26-Sep-07	Well 4	X	X	NEG	Tested in House
26-Sep-07	Well 3A	X	X	NEG	Tested in House
26-Sep-07	Well 3	X	X	NEG	Tested in House
26-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
26-Sep-07	V H Booster	X	X	NEG	Tested in House
26-Sep-07	Fire Hall	<1	<1		Tested at Caro Lab
26-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
26-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
27-Sep-07	V H Booster	X	X	NEG	Tested in House
27-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
27-Sep-07	Boundary Lodge	X	X	NEG	Tested in House
28-Sep-07	V H Booster	X	X	NEG	Tested in House
28-Sep-07	Hardy View Lodge	X	X	NEG	Tested in House
28-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
29-Sep-07	Well 5	X	X	NEG	Tested in House
29-Sep-07	V H Booster	X	X	NEG	Tested in House

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
29-Sep-07	Omega II	X	X	NEG	Tested in House
29-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
30-Sep-07	Well 3A	<1	<1		Tested at Caro Lab
30-Sep-07	V H Booster	<1	<1		Tested at Caro Lab
30-Sep-07	V H Booster	X	X	NEG	Tested in House
30-Sep-07	Petro Canada	X	X	NEG	Tested in House
30-Sep-07	East Zone Reservoir	<1	<1		Tested at Caro Lab
30-Sep-07	East Zone Reservoir	X	X	NEG	Tested in House
1-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
1-Oct-07	Valley Heights Booster			Neg	In House
1-Oct-07	Treatment Plant			Neg	In House
1-Oct-07	FireHall	<1	<1		Tested at Caro
1-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
1-Oct-07	East Zone Reservoir			Neg	In House
2-Oct-07	Well 5			Neg	In House
2-Oct-07	Well 3A	<1	<1		Tested at Caro
2-Oct-07	Well 3A	<1	<1		Tested at Caro
2-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
2-Oct-07	Valley Heights Booster			Neg	In House
2-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
2-Oct-07	East Zone Reservoir			Neg	In House
2-Oct-07	Boundary Hospital	<1	<1		Tested at Caro
3-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
3-Oct-07	Valley Heights Booster			Neg	In House
3-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
3-Oct-07	East Zone Reservoir			Neg	In House
3-Oct-07	City Hall			Neg	In House
3-Oct-07	Aquatic Center	<1	<1		Tested at Caro
4-Oct-07	Valley Heights Booster			Neg	In House
4-Oct-07	East Zone Reservoir			Neg	In House
4-Oct-07	Black Knight			Neg	In House
5-Oct-07	Valley Heights Booster			Neg	In House
5-Oct-07	FireHall			Neg	In House
5-Oct-07	East Zone Reservoir			Neg	In House
5-Oct-07	7463 Valley Heights			Neg	In House
6-Oct-07	Valley Heights Booster			Neg	In House
6-Oct-07	East Zone Reservoir			Neg	In House
7-Oct-07	Valley Heights Booster			Neg	In House
7-Oct-07	East Zone Reservoir			Neg	In House
8-Oct-07	Valley Heights Booster			Neg	In House
8-Oct-07	East Zone Reservoir			Neg	In House
9-Oct-07	Well3			Neg	In House
9-Oct-07	Well 3A			Neg	In House
9-Oct-07	Valley Heights Booster			Neg	In House
9-Oct-07	East Zone Reservoir			Neg	In House
10-Oct-07	Well 5	<1	<1		Tested at Caro
10-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
10-Oct-07	Valley Heights Booster			Neg	In House
10-Oct-07	FireHall	<1	<1		Tested at Caro
10-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
10-Oct-07	East Zone Reservoir			Neg	In House
10-Oct-07	Boundary Hospital	<1	<1		Tested at Caro
10-Oct-07	7976 Riverside Dr.			Neg	In House
12-Oct-07	Valley Heights Booster			Neg	In House
12-Oct-07	Sunshine Special Care			Neg	In House
12-Oct-07	East Zone Reservoir			Neg	In House
12-Oct-07	Boundary Lodge			Neg	In House
13-Oct-07	Valley Heights Booster			Neg	In House
13-Oct-07	East Zone Reservoir			Neg	In House
14-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
14-Oct-07	Valley Heights Booster			Neg	In House
14-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
14-Oct-07	East Zone Reservoir			Neg	In House
15-Oct-07	Works Yard	<1	<1		Tested at Caro
15-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
15-Oct-07	Valley Heights Booster			Neg	In House
15-Oct-07	FireHall			Neg	In House
15-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
15-Oct-07	East Zone Reservoir			Neg	In House
16-Oct-07	Well 5			Neg	In House
16-Oct-07	Well 3A	<1	<1		Tested at Caro
16-Oct-07	Well 3	<1	<1		Tested at Caro
16-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
16-Oct-07	Valley Heights Booster			Neg	In House
16-Oct-07	FireHall	<1	<1		Tested at Caro
16-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
16-Oct-07	East Zone Reservoir			Neg	In House
16-Oct-07	Boundary Hospital	<1	<1		Tested at Caro
17-Oct-07	Well 2			Neg	In House
17-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
17-Oct-07	Valley Heights Booster			Neg	In House
17-Oct-07	Petro Canada	<1	<1		Tested at Caro
17-Oct-07	Petro Canada			Neg	In House

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
17-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
17-Oct-07	East Zone Reservoir			Neg	In House
18-Oct-07	Valley Heights Booster			Neg	In House
18-Oct-07	Perley School			Neg	In House
18-Oct-07	Hutton School			Neg	In House
18-Oct-07	High School			Neg	In House
18-Oct-07	East Zone Reservoir			POS	In House
19-Oct-07	Valley Heights Booster			Neg	In House
19-Oct-07	PRV Station			Neg	In House
19-Oct-07	East Zone Reservoir			NEG	In House
20-Oct-07	Valley Heights Booster			Neg	In House
20-Oct-07	East Zone Reservoir			Neg	In House
21-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
21-Oct-07	Valley Heights Booster			Neg	In House
21-Oct-07	Omega II Restaurant	<1	<1		Tested at Caro
21-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
21-Oct-07	East Zone Reservoir			Neg	In House
22-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
22-Oct-07	Valley Heights Booster			Neg	In House
22-Oct-07	G F Arena			Neg	In House
22-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
22-Oct-07	East Zone Reservoir			Neg	In House
22-Oct-07	City Hall	<1	<1		Tested at Caro
23-Oct-07	Well 5	<1	<1	Back Ground	Tested at Caro
23-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
23-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
23-Oct-07	Boundary Hospital	<1	<1		Tested at Caro
24-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
24-Oct-07	Valley Heights Booster			Neg	In House
24-Oct-07	FireHall	<1	<1		Tested at Caro
24-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
24-Oct-07	East Zone Reservoir			Neg	In House
24-Oct-07	2660 75th Ave.			POS	In House
25-Oct-07	Valley Heights Booster			Neg	In House
25-Oct-07	High School			Neg	In House
25-Oct-07	East Zone Reservoir			Neg	In House
25-Oct-07	2660 75th Ave.			NEG	In House
26-Oct-07	Well 5			Neg	In House
26-Oct-07	Valley Heights Booster			Neg	In House
26-Oct-07	East Zone Reservoir			Neg	In House
26-Oct-07	6933 16th Street			Neg	In House
27-Oct-07	Valley Heights Booster			Neg	In House
27-Oct-07	East Zone Reservoir			Neg	In House
28-Oct-07	Well 5	<1	<1		Tested at Caro
28-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
28-Oct-07	Valley Heights Booster			Neg	In House
28-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
28-Oct-07	East Zone Reservoir			Neg	In House
29-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
29-Oct-07	Valley Heights Booster			Neg	In House
29-Oct-07	Perley School			Neg	In House
29-Oct-07	FireHall	<1	<1		Tested at Caro
29-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
29-Oct-07	East Zone Reservoir			Neg	In House
30-Oct-07	Well 5			Neg	In House
30-Oct-07	Well 3A	<1	<1		Tested at Caro
30-Oct-07	Well 3	<1	<1		Tested at Caro
30-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
30-Oct-07	Valley Heights Booster			Neg	In House
30-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
30-Oct-07	East Zone Reservoir			Neg	In House
30-Oct-07	Boundary Hospital	<1	<1		Tested at Caro
31-Oct-07	Well 2			Neg	In House
31-Oct-07	Valley Heights Booster	<1	<1		Tested at Caro
31-Oct-07	Valley Heights Booster			Neg	In House
31-Oct-07	Hutton School			Neg	In House
31-Oct-07	East Zone Reservoir	<1	<1		Tested at Caro
31-Oct-07	East Zone Reservoir			Neg	In House
31-Oct-07	City Hall	<1	<1		Tested at Caro
1-Nov-07	Valley Heights Booster			NEG	Tested in House
1-Nov-07	GFSS			NEG	Tested in House
1-Nov-07	East Zone Reservoir			NEG	Tested in House
2-Nov-07	Valley Heights Booster			NEG	Tested in House
2-Nov-07	Hardy View Lodge			NEG	Tested in House
2-Nov-07	East Zone Reservoir			NEG	Tested in House
3-Nov-07	Valley Heights Booster			NEG	Tested in House
3-Nov-07	East Zone Reservoir			NEG	Tested in House
4-Nov-07	Valley Heights Booster			NEG	Tested in House
4-Nov-07	East Zone Reservoir			NEG	Tested in House
5-Nov-07	Valley Heights Booster			NEG	Tested in House
5-Nov-07	East Zone Reservoir	<1	<1		Tested at Caro
5-Nov-07	East Zone Reservoir			NEG	Tested in House
5-Nov-07	Cemetery			NEG	Tested in House

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
6-Nov-07	Well 5	<1	<1		Tested at Caro
6-Nov-07	Well 3A			NEG	Tested in House
6-Nov-07	Well 3			NEG	Tested in House
6-Nov-07	Valley Heights Booster	<1	<1		Tested at Caro
6-Nov-07	Valley Heights Booster			NEG	Tested in House
6-Nov-07	East Zone Reservoir	<1	<1		Tested at Caro
6-Nov-07	East Zone Reservoir			NEG	Tested in House
6-Nov-07	Boundary Hospital	<1	<1		Tested at Caro
7-Nov-07	Valley Heights Booster			NEG	Tested in House
7-Nov-07	Hutton School			NEG	Tested in House
7-Nov-07	East Zone Reservoir	<1	<1		Tested at Caro
7-Nov-07	East Zone Reservoir			NEG	Tested in House
7-Nov-07	Boundary Lodge	<1	<1		Tested at Caro
8-Nov-07	Valley Heights Booster			NEG	Tested in House
8-Nov-07	Perley School			NEG	Tested in House
8-Nov-07	East Zone Reservoir			NEG	Tested in House
9-Nov-07	Valley Heights Booster			NEG	Tested in House
9-Nov-07	Hardy View Lodge			NEG	Tested in House
9-Nov-07	East Zone Reservoir			NEG	Tested in House
10-Nov-07	Valley Heights Booster			NEG	Tested in House
10-Nov-07	East Zone Reservoir			NEG	Tested in House
11-Nov-07	Valley Heights Booster			NEG	Tested in House
11-Nov-07	East Zone Reservoir			NEG	Tested in House
12-Nov-07	Valley Heights Booster	<1	<1		Tested at Caro
12-Nov-07	Valley Heights Booster			NEG	Tested in House
12-Nov-07	East Zone Reservoir	<1	<1		Tested at Caro
12-Nov-07	East Zone Reservoir			NEG	Tested in House
13-Nov-07	Well 5			NEG	Tested in House
13-Nov-07	Well 3A	<1	<1		Tested at Caro
13-Nov-07	Well 3	<1	<1		Tested at Caro
13-Nov-07	Well 2			NEG	Tested in House
13-Nov-07	Valley Heights Booster	<1	<1		Tested at Caro
13-Nov-07	East Zone Reservoir			NEG	Tested in House
13-Nov-07	Boundary Hospital	<1	<1		Tested at Caro
14-Nov-07	Valley Heights Booster			NEG	Tested in House
14-Nov-07	Perley School	<1	<1		Tested at Caro
14-Nov-07	Hutton School			NEG	Tested in House
14-Nov-07	East Zone Reservoir	<1	<1		Tested at Caro
14-Nov-07	East Zone Reservoir			NEG	Tested in House
15-Nov-07	Valley Heights Booster			NEG	Tested in House
15-Nov-07	Super Save Gas			NEG	Tested in House
15-Nov-07	East Zone Reservoir			NEG	Tested in House
16-Nov-07	Valley Heights Booster			NEG	Tested in House
16-Nov-07	East Zone Reservoir			NEG	Tested in House
16-Nov-07	Boundary Lodge			NEG	Tested in House
17-Nov-07	Valley Heights Booster			NEG	Tested in House
17-Nov-07	East Zone Reservoir			NEG	Tested in House
18-Nov-07	Valley Heights Booster			NEG	Tested in House
18-Nov-07	East Zone Reservoir			NEG	Tested in House
19-Nov-07	Valley Heights Booster			NEG	Tested in House
19-Nov-07	GFSS	<1	<1		Tested at Caro
19-Nov-07	East Zone Reservoir	<1	<1		Tested at Caro
19-Nov-07	East Zone Reservoir			NEG	Tested in House
20-Nov-07	Well 5	<1	<1		Tested at Caro
20-Nov-07	Well 3A			NEG	Tested in House
20-Nov-07	Well 3			NEG	Tested in House
20-Nov-07	Well 2	<1	<1		Tested at Caro
20-Nov-07	Valley Heights Booster	<1	<1		Tested at Caro
20-Nov-07	East Zone Reservoir			NEG	Tested in House
20-Nov-07	Boundary Hospital	<1	<1		Tested at Caro
21-Nov-07	Valley Heights Booster			NEG	Tested in House
21-Nov-07	Perley School			NEG	Tested in House
21-Nov-07	Hutton School	<1	<1		Tested at Caro
21-Nov-07	East Zone Reservoir	<1	<1		Tested at Caro
22-Nov-07	Valley Heights Booster			NEG	Tested in House
22-Nov-07	East Zone Reservoir			NEG	Tested in House
23-Nov-07	Valley Heights Booster			NEG	Tested in House
23-Nov-07	Hardy View Lodge			NEG	Tested in House
23-Nov-07	East Zone Reservoir			NEG	Tested in House
24-Nov-07	Valley Heights Booster			NEG	Tested in House
24-Nov-07	East Zone Reservoir			NEG	Tested in House
25-Nov-07	Valley Heights Booster			NEG	Tested in House
25-Nov-07	East Zone Reservoir			NEG	Tested in House
26-Nov-07	Valley Heights Booster			NEG	Tested in House
26-Nov-07	East Zone Reservoir			NEG	Tested in House
26-Nov-07	City Hall			NEG	Tested in House
27-Nov-07	Well 5			NEG	Tested in House
27-Nov-07	Well 3A	<1	<1		Tested at Caro
27-Nov-07	Well 3	<1	<1		Tested at Caro
27-Nov-07	Well 2			NEG	Tested in House
27-Nov-07	Valley Heights Booster	<1	<1		Tested at Caro
27-Nov-07	East Zone Reservoir	<1	<1		Tested at Caro
27-Nov-07	East Zone Reservoir			NEG	Tested in House

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
27-Nov-07	Boundary Hospital	<1	<1		Tested at Caro
28-Nov-07	Valley Heights Booster			NEG	Tested in House
28-Nov-07	Perley School				Tested at Caro
28-Nov-07	Hutton School			NEG	Tested in House
28-Nov-07	East Zone Reservoir				Tested at Caro
29-Nov-07	Valley Heights Booster			NEG	Tested in House
29-Nov-07	East Zone Reservoir			NEG	Tested in House
29-Nov-07	6311 12th Street			NEG	Tested in House
30-Nov-07	Valley Heights Booster			NEG	Tested in House
30-Nov-07	Firehall			NEG	Tested in House
30-Nov-07	East Zone Reservoir			NEG	Tested in House
3-Dec-07	East Zone Reservoir	POS	NEG	POS	Tested in House
3-Dec-07	Valley Heights Booster			NEG	Tested in House
3-Dec-07	Valley Heights Booster	<1	<1		Tested at Caro
3-Dec-07	Hutton School			NEG	Tested in House
3-Dec-07	East Zone Reservoir	<1	<1		Tested at Caro
4-Dec-07	East Zone Reservoir	POS	NEG	POS	Tested in House
4-Dec-07	Well 5	<1	<1		Tested at Caro
4-Dec-07	Well 3			NEG	Tested in House
4-Dec-07	Well 2	<1	<1		Tested at Caro
4-Dec-07	Valley Heights Booster	<1	<1		Tested at Caro
4-Dec-07	Valley Heights Booster			NEG	Tested in House
4-Dec-07	Perley School	<1	<1		Tested at Caro
4-Dec-07	East Zone Reservoir	<1	<1		Tested at Caro
4-Dec-07	Boundary Hospital	<1	<1		Tested at Caro
5-Dec-07	Well 3A			NEG	Tested in House
5-Dec-07	Valley Heights Booster			NEG	Tested in House
5-Dec-07	East Zone Reservoir			NEG	Tested in House
5-Dec-07	East Zone Reservoir			NEG	Tested in House
5-Dec-07	East Zone Reservoir	<1	<1		Tested at Caro
5-Dec-07	Abbyfield			NEG	Tested in House
6-Dec-07	Valley Heights Booster			NEG	Tested in House
6-Dec-07	Pope & Talbot	<1	<1		Tested at Caro
6-Dec-07	Highschool	<1	<1		Tested at Caro
6-Dec-07	EZ DRAIN			NEG	Tested in House
6-Dec-07	East Zone Reservoir	<1	<1		Tested at Caro
6-Dec-07	East Zone Reservoir			NEG	Tested in House
6-Dec-07	Can Par	<1	<1		Tested at Caro
6-Dec-07	Boundary Lodge	<1	<1		Tested at Caro
7-Dec-07	Valley Heights Booster			NEG	Tested in House
7-Dec-07	Omega II			NEG	Tested in House
7-Dec-07	East Zone Reservoir			NEG	Tested in House
7-Dec-07	128 Victoria Way			NEG	Tested in House
8-Dec-07	Valley Heights Booster			NEG	Tested in House
8-Dec-07	East Zone Reservoir			NEG	Tested in House
8-Dec-07	7619 Granby Rd.			NEG	Tested in House
9-Dec-07	Valley Heights Booster			NEG	Tested in House
9-Dec-07	East Zone Reservoir			NEG	Tested in House
9-Dec-07	Chevron			NEG	Tested in House
10-Dec-07	East Zone Reservoir	POS	NEG	POS	Tested in House
10-Dec-07	Valley Heights Booster			NEG	Tested in House
10-Dec-07	6435 9th St.			NEG	Tested in House
10-Dec-07	6144 12th St.			NEG	Tested in House
11-Dec-07	Well 5			NEG	Tested in House
11-Dec-07	Well 3A	<1	<1		Tested at Caro
11-Dec-07	Well 3	<1	<1		Tested at Caro
11-Dec-07	Well 2			NEG	Tested in House
11-Dec-07	Valley Heights Booster	<1	<1		Tested at Caro
11-Dec-07	Valley Heights Booster			NEG	Tested in House
11-Dec-07	N 19th dead end			NEG	Tested in House
11-Dec-07	East Zone Reservoir	<1	<1		Tested at Caro
11-Dec-07	East Zone Reservoir			NEG	Tested in House
11-Dec-07	Boundary Hospital	<1	<1		Tested at Caro
12-Dec-07	Valley Heights Booster	<1	<1		Tested at Caro
12-Dec-07	Valley Heights Booster			NEG	Tested in House
12-Dec-07	Hutton School			NEG	Tested in House
12-Dec-07	Firehall	<1	<1		Tested at Caro
12-Dec-07	East Zone Reservoir	<1	<1		Tested at Caro
12-Dec-07	East Zone Reservoir			NEG	Tested in House
13-Dec-07	Valley Heights Booster	<1	<1		Tested at Caro
13-Dec-07	Valley Heights Booster			NEG	Tested in House
13-Dec-07	Super Save			NEG	Tested in House
13-Dec-07	East Zone Reservoir	<1	<1		Tested at Caro
13-Dec-07	East Zone Reservoir			NEG	Tested in House
13-Dec-07	7487 2nd St.			NEG	Tested in House
13-Dec-07	6933 16th St.	<1	<1		Tested at Caro
14-Dec-07	Valley Heights Booster			NEG	Tested in House
14-Dec-07	Mix's House			NEG	Tested in House
14-Dec-07	East Zone Reservoir			NEG	Tested in House
15-Dec-07	Went End Store			NEG	Tested in House
15-Dec-07	East Zone Reservoir			NEG	Tested in House
16-Dec-07	Valley Heights Booster			NEG	Tested in House
16-Dec-07	Valley Heights Booster	<1	<1		Tested at Caro

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
16-Dec-07	East Zone Reservoir	<1	<1		Tested at Caro
16-Dec-07	East Zone Reservoir			NEG	Tested in House
17-Dec-07	Valley Heights Booster			NEG	Tested in House
17-Dec-07	Valley Heights Booster			NEG	Tested in House
17-Dec-07	PRV Station			NEG	Tested in House
17-Dec-07	Perley Annex			NEG	Tested in House
17-Dec-07	East Zone Reservoir			NEG	Tested in House
17-Dec-07	Cemetery			NEG	Tested in House
18-Dec-07	Valley Heights Booster	<1	<1		Tested at Caro
18-Dec-07	Valley Heights Booster			NEG	Tested in House
18-Dec-07	Hutton School			NEG	Tested in House
18-Dec-07	East Zone Reservoir	<1	<1		Tested at Caro
18-Dec-07	East Zone Reservoir			NEG	Tested in House
18-Dec-07	Boundary Lodge			NEG	Tested in House
18-Dec-07	Boundary Hospital	<1	<1		Tested at Caro
19-Dec-07	Valley Heights Booster			NEG	Tested in House
19-Dec-07	Super Save			NEG	Tested in House
19-Dec-07	East Zone Reservoir			NEG	Tested in House
20-Dec-07	Valley Heights Booster			NEG	Tested in House
20-Dec-07	Petro Canada			NEG	Tested in House
20-Dec-07	East Zone Reservoir			NEG	Tested in House
20-Dec-07	Aquatic Center			NEG	Tested in House
27-Dec-07	Valley Heights Booster			NEG	Tested in House
27-Dec-07	East Zone Reservoir			NEG	Tested in House
27-Dec-07	Curves			NEG	Tested in House
27-Dec-07	Boundary Hospital			NEG	Tested in House
28-Dec-07	Valley Heights Booster			NEG	Tested in House
28-Dec-07	G F Arena			NEG	Tested in House
28-Dec-07	East Zone Reservoir			NEG	Tested in House
28-Dec-07	City Hall			NEG	Tested in House
31-Dec-07	Valley Heights Booster			NEG	Tested in House
31-Dec-07	Hardyview Lodge			NEG	Tested in House
31-Dec-07	Emcon Services			NEG	Tested in House
31-Dec-07	East Zone Reservoir			NEG	Tested in House
31-Dec-07	Boundary Lodge			NEG	Tested in House
2-Jan-08	Valley Heights Booster			NEG	Tested in House
2-Jan-08	East Zone Reservoir			NEG	Tested in House
2-Jan-08	Boundary Hospital			NEG	Tested in House
3-Jan-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
3-Jan-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
3-Jan-08	Boundary Hospital	<1	<1		Tested at Caro Lab
7-Jan-08	Valley Heights Booster			NEG	Tested in House
7-Jan-08	Super Save Gas			NEG	Tested in House
7-Jan-08	East Zone Reservoir			NEG	Tested in House
8-Jan-08	Well 5	<1	<1		Tested at Caro Lab
8-Jan-08	Well 3A	<1	<1		Tested at Caro Lab
8-Jan-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
8-Jan-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
8-Jan-08	Boundary Hospital	<1	<1		Tested at Caro Lab
9-Jan-08	Well 3			NEG	Tested in House
9-Jan-08	Well 2			NEG	Tested in House
9-Jan-08	East Zone Reservoir			NEG	Tested in House
14-Jan-08	Valley Heights Booster			NEG	Tested in House
14-Jan-08	East Zone Reservoir			NEG	Tested in House
15-Jan-08	Well 3	<1	<1		Tested at Caro Lab
15-Jan-08	Well 2	<1	<1		Tested at Caro Lab
15-Jan-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
15-Jan-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
15-Jan-08	Boundary Hospital	<1	<1		Tested at Caro Lab
16-Jan-08	Well 5			NEG	Tested in House
16-Jan-08	Well 3A			NEG	Tested in House
16-Jan-08	East Zone Reservoir			NEG	Tested in House
21-Jan-08	East Zone Reservoir			NEG	Tested in House
22-Jan-08	Well 5	<1	<1		Tested at Caro Lab
22-Jan-08	Well 3A	<1	<1		Tested at Caro Lab
22-Jan-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
22-Jan-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
22-Jan-08	Boundary Hospital	<1	<1		Tested at Caro Lab
24-Jan-08	East Zone Reservoir			NEG	Tested in House
29-Jan-08	Well 5	<1	<1		Tested at Caro Lab
29-Jan-08	Well 3A	<1	<1		Tested at Caro Lab
29-Jan-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
29-Jan-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
29-Jan-08	Boundary Hospital	<1	<1		Tested at Caro Lab
4-Feb-08	East Zone Reservoir			NEG	Tested in House
5-Feb-08	Well 3	<1	<1		Tested at Caro Lab
5-Feb-08	Well 2	<1	<1		Tested at Caro Lab
5-Feb-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
5-Feb-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
5-Feb-08	Boundary Hospital	<1	<1		Tested at Caro Lab
6-Feb-08	East Zone Reservoir			NEG	Tested in House
12-Feb-08	Well 5	<1	<1		Tested at Caro Lab
12-Feb-08	Well 3A	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
12-Feb-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
12-Feb-08	Valley Heights Booster			NEG	Tested in House
12-Feb-08	High School			NEG	Tested in House
12-Feb-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
12-Feb-08	East Zone Reservoir			NEG	Tested in House
12-Feb-08	Boundary Hospital	<1	<1		Tested at Caro Lab
14-Feb-08	East Zone Reservoir			NEG	Tested in House
18-Feb-08	Hutton School			NEG	Tested in House
18-Feb-08	East Zone Reservoir			NEG	Tested in House
19-Feb-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
19-Feb-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
19-Feb-08	Boundary Hospital	<1	<1		Tested at Caro Lab
20-Feb-08	East Zone Reservoir			NEG	Tested in House
25-Feb-08	East Zone Reservoir			NEG	Tested in House
26-Feb-08	Well 5	<1	<1		Tested at Caro Lab
26-Feb-08	Well 3	<1	<1		Tested at Caro Lab
26-Feb-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
26-Feb-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
26-Feb-08	Boundary Hospital	<1	<1		Tested at Caro Lab
4-Mar-08	Well 3A	<1	<1		Tested at Caro Lab
4-Mar-08	Well 2	<1	<1		Tested at Caro Lab
4-Mar-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
4-Mar-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
4-Mar-08	Boundary Hospital	<1	<1		Tested at Caro Lab
5-Mar-08	Well 5			NEG	Tested in House
5-Mar-08	Well 3			NEG	Tested in House
6-Mar-08	East Zone Reservoir			NEG	Tested in House
11-Mar-08	Well 5	<1	<1		Tested at Caro Lab
11-Mar-08	Well 3	<1	<1		Tested at Caro Lab
11-Mar-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
11-Mar-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
11-Mar-08	Boundary Hospital	<1	<1		Tested at Caro Lab
12-Mar-08	Valley Heights booster	X	X	NEG	Tested in House
13-Mar-08	East Zone Reservoir			NEG	Tested in House
18-Mar-08	Well 3A	<1	<1		Tested at Caro Lab
18-Mar-08	Well 2	<1	<1		Tested at Caro Lab
18-Mar-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
18-Mar-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
18-Mar-08	Boundary Hospital	<1	<1		Tested at Caro Lab
25-Mar-08	Well 5	<1	<1		Tested at Caro Lab
25-Mar-08	Well 3	<1	<1		Tested at Caro Lab
25-Mar-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
25-Mar-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
25-Mar-08	Boundary Hospital	<1	<1		Tested at Caro Lab
27-Mar-08	East Zone Reservoir			NEG	Tested in House
1-Apr-08	Well 3A	<1	<1		Tested at Caro Lab
1-Apr-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
1-Apr-08	Hutton School	<1	<1		Tested at Caro Lab
1-Apr-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
1-Apr-08	Boundary Hospital	<1	<1		Tested at Caro Lab
2-Apr-08	City Park Campground			NEG	Tested in House
2-Apr-08	5th St. and 71st Ave.			NEG	Tested in House
9-Apr-08	Well 5	<1	<1		Tested at Caro Lab
9-Apr-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
9-Apr-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
9-Apr-08	Boundary Lodge	<1	<1		Tested at Caro Lab
9-Apr-08	Boundary Hospital	<1	<1		Tested at Caro Lab
15-Apr-08	Well 3A	<1	<1		Tested at Caro Lab
15-Apr-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
15-Apr-08	Perley School	<1	<1		Tested at Caro Lab
15-Apr-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
15-Apr-08	Boundary Hospital	<1	<1		Tested at Caro Lab
17-Apr-08	East Zone Reservoir			NEG	Tested in House
22-Apr-08	Well 5	<1	<1		Tested at Caro Lab
22-Apr-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
22-Apr-08	Hutton School	<1	<1		Tested at Caro Lab
22-Apr-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
22-Apr-08	Boundary Hospital	<1	<1		Tested at Caro Lab
24-Apr-08	East Zone Reservoir			NEG	Tested in House
28-Apr-08	Well 3A	<1	<1		Tested at Caro Lab
28-Apr-08	Well 3	<1	<1		Tested at Caro Lab
28-Apr-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
28-Apr-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
28-Apr-08	Boundary Hospital	<1	<1		Tested at Caro Lab
1-May-08	East Zone Reservoir			NEG	Tested in House
6-May-08	Well 5	<1	<1		Tested at Caro Lab
6-May-08	Well 2	<1	<1		Tested at Caro Lab
6-May-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
6-May-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
6-May-08	Boundary Hospital	<1	<1		Tested at Caro Lab
13-May-08	Well 3	<1	<1		Tested at Caro Lab
13-May-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
13-May-08	East Zone Reservoir	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
13-May-08	Boundary Lodge	<1	<1		Tested at Caro Lab
13-May-08	Boundary Hospital	<1	<1		Tested at Caro Lab
22-May-08	Well 3	<1	<1		Tested at Caro Lab
22-May-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
22-May-08	Perley School	<1	<1		Tested at Caro Lab
22-May-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
22-May-08	Boundary Hospital	<1	<1		Tested at Caro Lab
28-May-08	Well 3	<1	<1		Tested at Caro Lab
28-May-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
28-May-08	Hutton School	<1	<1		Tested at Caro Lab
28-May-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
28-May-08	Boundary Hospital	<1	<1		Tested at Caro Lab
3-Jun-08	Well 5	<1	<1		Tested at Caro Lab
3-Jun-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
3-Jun-08	Perley School	<1	<1		Tested at Caro Lab
3-Jun-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
3-Jun-08	Boundary Hospital	<1	<1		Tested at Caro Lab
10-Jun-08	Well 2	<1	<1		Tested at Caro Lab
10-Jun-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
10-Jun-08	Highschool	<1	<1		Tested at Caro Lab
10-Jun-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
10-Jun-08	Boundary Hospital	<1	<1		Tested at Caro Lab
17-Jun-08	Well 3A	<1	<1		Tested at Caro Lab
17-Jun-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
17-Jun-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
17-Jun-08	Boundary Hospital	<1	<1		Tested at Caro Lab
24-Jun-08	Well 5	<1	<1		Tested at Caro Lab
24-Jun-08	Well 3A	<1	<1		Tested at Caro Lab
24-Jun-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
24-Jun-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
24-Jun-08	Boundary Hospital	<1	<1		Tested at Caro Lab
2-Jul-08	Well 3	<1	<1		Tested at Caro Lab
2-Jul-08	Well 2	<1	<1		Tested at Caro Lab
2-Jul-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
2-Jul-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
2-Jul-08	Boundary Hospital	<1	<1		Tested at Caro Lab
8-Jul-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
8-Jul-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
8-Jul-08	City Hall	<1	<1		Tested at Caro Lab
8-Jul-08	Boundary Hospital	<1	<1		Tested at Caro Lab
9-Jul-08	2181 72nd Ave.			NEG	Tested in House
15-Jul-08	Works Yard	<1	<1		Tested at Caro Lab
15-Jul-08	Well 2	<1	<1		Tested at Caro Lab
15-Jul-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
15-Jul-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
15-Jul-08	Boundary Hospital	<1	<1		Tested at Caro Lab
22-Jul-08	Well 3A	<1	<1		Tested at Caro Lab
22-Jul-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
22-Jul-08	Lordco Autoparts	<1	<1		Tested at Caro Lab
22-Jul-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
22-Jul-08	Boundary Hospital	<1	<1		Tested at Caro Lab
29-Jul-08	Well 3	<1	<1		Tested at Caro Lab
5-Aug-08	Well 2	<1	<1		Tested at Caro Lab
5-Aug-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
5-Aug-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
5-Aug-08	Boundary Lodge	<1	<1		Tested at Caro Lab
5-Aug-08	Boundary Hospital	<1	<1		Tested at Caro Lab
13-Aug-08	Shell on Central Ave.			NEG	Tested in House
13-Aug-08	CL2 Contact Chamber			NEG	Tested in House
15-Aug-08	Valley Heights Booster			NEG	Tested in House
15-Aug-08	East Zone Reservoir			NEG	Tested in House
15-Aug-08	Boundary Hospital			NEG	Tested in House
19-Aug-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
19-Aug-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
19-Aug-08	Donaldson Park	<1	<1		Tested at Caro Lab
19-Aug-08	Boundary Hospital	<1	<1		Tested at Caro Lab
26-Aug-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
26-Aug-08	Highschool	<1	<1		Tested at Caro Lab
26-Aug-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
26-Aug-08	Boundary Hospital	<1	<1		Tested at Caro Lab
2-Sep-08	Well 3A	<1	<1		Tested at Caro Lab
2-Sep-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
2-Sep-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
2-Sep-08	Boundary Hospital	<1	<1		Tested at Caro Lab
8-Sep-08	Well 5	<1	<1		Tested at Caro Lab
8-Sep-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
8-Sep-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
8-Sep-08	Boundary Hospital	<1	<1		Tested at Caro Lab
8-Sep-08	Alf's subdivision	<1	<1		Tested at Caro Lab
16-Sep-08	Well 3	<1	<1		Tested at Caro Lab
16-Sep-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
16-Sep-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
16-Sep-08	Boundary Hospital	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
16-Sep-08	Alf's subdivision	<1	<1		Tested at Caro Lab
23-Sep-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
23-Sep-08	Perley School	<1	<1		Tested at Caro Lab
23-Sep-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Sep-08	Boundary Hospital	<1	<1		Tested at Caro Lab
30-Sep-08	Well 2	<1	<1		Tested at Caro Lab
30-Sep-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
30-Sep-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
30-Sep-08	Boundary Hospital	<1	<1		Tested at Caro Lab
7-Oct-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
7-Oct-08	G.F. High school	<1	<1		Tested at Caro Lab
7-Oct-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
7-Oct-08	Boundary Hospital	<1	<1		Tested at Caro Lab
14-Oct-08	Well 5	<1	<1		Tested at Caro Lab
14-Oct-08	Well 2	<1	<1		Tested at Caro Lab
14-Oct-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
14-Oct-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
14-Oct-08	Boundary Hospital	<1	<1		Tested at Caro Lab
21-Oct-08	Well 3	<1	<1		Tested at Caro Lab
21-Oct-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
21-Oct-08	Hutton School	<1	<1		Tested at Caro Lab
21-Oct-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
21-Oct-08	Boundary Hospital	<1	<1		Tested at Caro Lab
12-Nov-08	Well 4	<1	<1		Tested at Caro Lab
12-Nov-08	Well 2	<1	<1		Tested at Caro Lab
12-Nov-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
12-Nov-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
12-Nov-08	City Hall	<1	<1		Tested at Caro Lab
12-Nov-08	Boundary Hospital	<1	<1		Tested at Caro Lab
18-Nov-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
18-Nov-08	Super Save Gas	<1	<1		Tested at Caro Lab
18-Nov-08	G.F. Fire Hall	<1	<1		Tested at Caro Lab
18-Nov-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
18-Nov-08	Boundary Hospital	<1	<1		Tested at Caro Lab
19-Nov-08	Well 4	<1	<1		Tested at Caro Lab
25-Nov-08	Well 5	<1	<1		Tested at Caro Lab
25-Nov-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
25-Nov-08	Hutton School	<1	<1		Tested at Caro Lab
25-Nov-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
25-Nov-08	Boundary Hospital	<1	<1		Tested at Caro Lab
2-Dec-08	Well 2	<1	<1		Tested at Caro Lab
2-Dec-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
2-Dec-08	Perley School	<1	<1		Tested at Caro Lab
2-Dec-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
2-Dec-08	Boundary Hospital	<1	<1		Tested at Caro Lab
9-Dec-08	Well 3A	<1	<1		Tested at Caro Lab
9-Dec-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
9-Dec-08	Hutton School	<1	<1		Tested at Caro Lab
9-Dec-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
9-Dec-08	Boundary Hospital	<1	<1		Tested at Caro Lab
16-Dec-08	Well 3	<1	<1		Tested at Caro Lab
16-Dec-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
16-Dec-08	Perley School	<1	<1		Tested at Caro Lab
16-Dec-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
16-Dec-08	Boundary Hospital	<1	<1		Tested at Caro Lab
22-Dec-08	Well 5	<1	<1		Tested at Caro Lab
22-Dec-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
22-Dec-08	Super Save Gas	<1	<1		Tested at Caro Lab
22-Dec-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
22-Dec-08	Boundary Hospital	<1	<1		Tested at Caro Lab
29-Dec-08	Valley Heights Booster	<1	<1		Tested at Caro Lab
29-Dec-08	Petro Can Gas	<1	<1		Tested at Caro Lab
29-Dec-08	East Zone Reservoir	<1	<1		Tested at Caro Lab
29-Dec-08	Buy Low Foods	<1	<1		Tested at Caro Lab
29-Dec-08	Boundary Hospital	<1	<1		Tested at Caro Lab
6-Jan-09	Well 3A	<1	<1		Tested at Caro Lab
6-Jan-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
6-Jan-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
6-Jan-09	Boundary Hospital	<1	<1		Tested at Caro Lab
13-Jan-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
13-Jan-09	Hutton School	<1	<1		Tested at Caro Lab
13-Jan-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
13-Jan-09	Curves	<1	<1		Tested at Caro Lab
13-Jan-09	Boundary Hospital	<1	<1		Tested at Caro Lab
20-Jan-09	Well 5	<1	<1		Tested at Caro Lab
20-Jan-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
20-Jan-09	Firehall	<1	<1		Tested at Caro Lab
20-Jan-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
20-Jan-09	Boundary Hospital	<1	<1		Tested at Caro Lab
27-Jan-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
27-Jan-09	Perley School	<1	<1		Tested at Caro Lab
27-Jan-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
27-Jan-09	Boundary Hospital	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
3-Feb-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
3-Feb-09	GF Aquatic Center	<1	<1		Tested at Caro Lab
3-Feb-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
3-Feb-09	Boundary Hospital	<1	<1		Tested at Caro Lab
10-Feb-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
10-Feb-09	Super Save Gas	<1	<1		Tested at Caro Lab
10-Feb-09	Pressure reducing station	<1	<1		Tested at Caro Lab
10-Feb-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
10-Feb-09	Boundary Hospital	<1	<1		Tested at Caro Lab
17-Feb-09	Well 5	<1	<1		Tested at Caro Lab
17-Feb-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
17-Feb-09	Perley School	<1	<1		Tested at Caro Lab
17-Feb-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
17-Feb-09	Boundary Hospital	<1	<1		Tested at Caro Lab
24-Feb-09	Well 3	<1	<1		Tested at Caro Lab
24-Feb-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
24-Feb-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
24-Feb-09	Curves			NEG	Tested in House
24-Feb-09	City Hall	<1	<1		Tested at Caro Lab
24-Feb-09	Buy Low Foods			NEG	Tested in House
24-Feb-09	Boundary Hospital	<1	<1		Tested at Caro Lab
24-Feb-09	Aquatic Center			NEG	Tested in House
3-Mar-09	Well 2	<1	<1		Tested at Caro Lab
3-Mar-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
3-Mar-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
3-Mar-09	Boundary Hospital	<1	<1		Tested at Caro Lab
10-Mar-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
10-Mar-09	Perley School	<1	<1		Tested at Caro Lab
10-Mar-09	Hutton School	<1	<1		Tested at Caro Lab
10-Mar-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
10-Mar-09	City Hall	<1	<1		Tested at Caro Lab
10-Mar-09	Boundary Hospital	<1	<1		Tested at Caro Lab
12-Mar-09	Well 3	<1	<1		Tested at Caro Lab
12-Mar-09	GF Pool			NEG	Tested in house
12-Mar-09	8015 McCallum			NEG	Tested in house
16-Mar-09	Super Save Gas			NEG	Tested in house
16-Mar-09	Lordco			NEG	Tested in house
16-Mar-09	GF Firehall			NEG	Tested in house
16-Mar-09	GF Construction			NEG	Tested in house
16-Mar-09	Boundary Hospital	<1	<1		Tested at Caro Lab
17-Mar-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
17-Mar-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
17-Mar-09	ABH Car Sales	<1	<1		Tested at Caro Lab
23-Mar-09	Station Pub			NEG	Tested in house
23-Mar-09	PRV Station	<1	<1		Tested at Caro Lab
23-Mar-09	Old Court House (washrm)			NEG	Tested in house
23-Mar-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
23-Mar-09	Boundary Hospital	<1	<1		Tested at Caro Lab
24-Mar-09	Well 5	<1	<1		Tested at Caro Lab
24-Mar-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
24-Mar-09	8167 Donaldson Dr.			NEG	Tested in house
31-Mar-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
31-Mar-09	Liquor Store			NEG	Tested in house
31-Mar-09	Evergreen Cemetary	<1	<1		Tested at Caro Lab
31-Mar-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
31-Mar-09	Boundary Hospital	<1	<1		Tested at Caro Lab
31-Mar-09	Airport	<1	<1		Tested at Caro Lab
31-Mar-09	7426 Valley Heights			NEG	Tested in house
1-Apr-09	Val-Mar Hydrant	<1	<1		Tested at Caro Lab
7-Apr-09	Well 3A	<1	<1		Tested at Caro Lab
7-Apr-09	Super Save Gas	<1	<1		Tested at Caro Lab
7-Apr-09	Shell Gas			NEG	Tested in house
7-Apr-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
7-Apr-09	Curves	<1	<1		Tested at Caro Lab
7-Apr-09	City Hall			NEG	Tested in house
7-Apr-09	2735 - 75th Street			NEG	Tested in house
14-Apr-09	VH Booster Pump	<1	<1		Tested at Caro Lab
14-Apr-09	VH Booster Pump	<1	<1		Tested at Caro Lab
14-Apr-09	Hospital	<1	<1		Tested at Caro Lab
14-Apr-09	Evergreen Cemetary	<1	<1		Tested at Caro Lab
14-Apr-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
21-Apr-09	Well 2	<1	<1		Tested at Caro Lab
21-Apr-09	VH Booster Pump	<1	<1		Tested at Caro Lab
21-Apr-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
21-Apr-09	City Hall	<1	<1		Tested at Caro Lab
21-Apr-09	Boundary Hospital	<1	<1		Tested at Caro Lab
28-Apr-09	VH Booster Pump	<1	<1		Tested at Caro Lab
28-Apr-09	Perley Elementary	<1	<1		Tested at Caro Lab
28-Apr-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
28-Apr-09	Boundary Hospital	<1	<1		Tested at Caro Lab
28-Apr-09	Airport	<1	<1		Tested at Caro Lab
5-May-09	Well 2	<1	<1		Tested at Caro Lab
5-May-09	Valley Heights Booster	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
5-May-09	Hutton School	<1	<1		Tested at Caro Lab
5-May-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
5-May-09	Boundary Hospital	<1	<1		Tested at Caro Lab
12-May-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
12-May-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
12-May-09	Del's Bistro	<1	<1		Tested at Caro Lab
12-May-09	Boundary Hospital	<1	<1		Tested at Caro Lab
19-May-09	Well 5	<1	<1		Tested at Caro Lab
19-May-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
19-May-09	GF Arena	<1	<1		Tested at Caro Lab
19-May-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
19-May-09	Boundary Hospital	<1	<1		Tested at Caro Lab
26-May-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
26-May-09	Firehall	<1	<1		Tested at Caro Lab
26-May-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
26-May-09	Boundary Hospital	<1	<1		Tested at Caro Lab
2-Jun-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
2-Jun-09	Hutton School	<1	<1		Tested at Caro Lab
2-Jun-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
2-Jun-09	Boundary Hospital	<1	<1		Tested at Caro Lab
9-Jun-09	Works Yard	<1	<1		Tested at Caro Lab
9-Jun-09	Super Save			NEG	Tested in house
9-Jun-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
9-Jun-09	Cemetery			NEG	Tested in house
9-Jun-09	Boundary Hospital	<1	<1		Tested at Caro Lab
9-Jun-09	Booster Station	<1	<1		Tested at Caro Lab
10-Jun-09	Blow Out @ Subdivision			NEG	Tested in house
16-Jun-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
16-Jun-09	Hydrant #74			NEG	Tested in house
16-Jun-09	Grand Forks City Hall			NEG	Tested in house
16-Jun-09	Grand Forks Airport			NEG	Tested in house
16-Jun-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Jun-09	Well #2			NEG	Tested in house
23-Jun-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
23-Jun-09	Evergreen Cemetary			NEG	Tested in house
23-Jun-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Jun-09	Boundary Hospital	<1	<1		Tested at Caro Lab
2-Jul-09	Well #3			NEG	Tested in house
2-Jul-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
2-Jul-09	Lordco			NEG	Tested in house
2-Jul-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
2-Jul-09	Boundary Hospital	<1	<1		Tested at Caro Lab
7-Jul-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
7-Jul-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
7-Jul-09	Boundary Hospital	<1	<1		Tested at Caro Lab
14-Jul-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
14-Jul-09	Market St Fountain			NEG	Tested in house
14-Jul-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
14-Jul-09	Dick Bartlett Pk Fountain			NEG	Tested in house
14-Jul-09	Boundary Hospital	<1	<1		Tested at Caro Lab
23-Jul-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
23-Jul-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Jul-09	Boundary Hospital	<1	<1		Tested at Caro Lab
29-Jul-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
29-Jul-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
29-Jul-09	Boundary Hospital	<1	<1		Tested at Caro Lab
5-Aug-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
5-Aug-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
5-Aug-09	Boundary Hospital	<1	<1		Tested at Caro Lab
6-Aug-09	CL2 Contact Bldg			NEG	Tested in house
6-Aug-09	Boundary Hospital	<1	<1		Tested at Caro Lab
11-Aug-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
11-Aug-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
11-Aug-09	Campers Washroom			NEG	Tested in house
13-Aug-09	Lordco-mens washroom			NEG	Tested in house
13-Aug-09	Boundary Hospital	<1	<1		Tested at Caro Lab
18-Aug-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
18-Aug-09	Poof-first aid room			NEG	Tested in house
18-Aug-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
20-Aug-09	Boundary Hospital	<1	<1		Tested at Caro Lab
20-Aug-09	334 C Market (Hookers)			NEG	Tested in house
24-Aug-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
24-Aug-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
24-Aug-09	Cal Lamontanges			NEG	Tested in house
27-Aug-09	JD Park			NEG	Tested in house
27-Aug-09	Boundary Hospital	<1	<1		Tested at Caro Lab
31-Aug-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
31-Aug-09	Rod Fofonoff residence			NEG	Tested in house
31-Aug-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
2-Sep-09	Lordco			NEG	Tested in house
2-Sep-09	Boundary Hospital	<1	<1		Tested at Caro Lab
8-Sep-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
8-Sep-09	Super Save Gas			NEG	Tested in house

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
8-Sep-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
9-Sep-09	Boundary Hospital	<1	<1		Tested at Caro Lab
9-Sep-09	Anex			NEG	Tested in house
14-Sep-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
14-Sep-09	PetroCan			NEG	Tested in house
14-Sep-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
16-Sep-09	Hutton Elementary			NEG	Tested in house
16-Sep-09	Boundary Hospital	<1	<1		Tested at Caro Lab
21-Sep-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
21-Sep-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
21-Sep-09	7425 - 2nd St.			NEG	Tested in house
22-Sep-09	Cemetery			NEG	Tested in house
22-Sep-09	Boundary Hospital	<1	<1		Tested at Caro Lab
28-Sep-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
28-Sep-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
28-Sep-09	Airport			NEG	Tested in house
6-Oct-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
6-Oct-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
6-Oct-09	Boundary Hospital	<1	<1		Tested at Caro Lab
13-Oct-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
13-Oct-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
13-Oct-09	Boundary Hospital	<1	<1		Tested at Caro Lab
15-Oct-09	WWTP			NEG	Tested in house
15-Oct-09	Boundary Hospital	<1	<1		Tested at Caro Lab
20-Oct-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
20-Oct-09	Scout Hall			NEG	Tested in house
20-Oct-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
22-Oct-09	Perley School			NEG	Tested in house
22-Oct-09	Hutton School			NEG	Tested in house
22-Oct-09	Boundary Hospital	<1	<1		Tested at Caro Lab
26-Oct-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
26-Oct-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
26-Oct-09	Curves			NEG	Tested in house
2-Nov-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
2-Nov-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
2-Nov-09	Boundary Hospital	<1	<1		Tested at Caro Lab
9-Nov-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
9-Nov-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
9-Nov-09	Boundary Hospital	<1	<1		Tested at Caro Lab
16-Nov-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
16-Nov-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
16-Nov-09	Boundary Hospital	<1	<1		Tested at Caro Lab
19-Nov-09	Liquor Store & More			NEG	Tested in House
19-Nov-09	Boundary Hospital	<1	<1		Tested at Caro Lab
23-Nov-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
23-Nov-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Nov-09	Buy Low Foods			NEG	Tested in House
30-Nov-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
30-Nov-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
30-Nov-09	Boundary Hospital	<1	<1		Tested at Caro Lab
3-Dec-09	Super Save Gas			NEG	Tested in House
3-Dec-09	City Hall			NEG	Tested in House
3-Dec-09	Boundary Hospital	<1	<1		Tested at Caro Lab
7-Dec-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
7-Dec-09	Petro Can			NEG	Tested in House
7-Dec-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
8-Dec-09	Boundary Hospital	<1	<1		Tested at Caro Lab
8-Dec-09	Aquatic Centre			NEG	Tested in House
14-Dec-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
14-Dec-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
14-Dec-09	7425-2nd Street			NEG	Tested in House
17-Dec-09	Hutton School			NEG	Tested in House
17-Dec-09	Boundary Hospital	<1	<1		Tested at Caro Lab
21-Dec-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
21-Dec-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
21-Dec-09	Clyde's Pub			NEG	Tested in House
23-Dec-09	GF Construction			NEG	Tested in House
23-Dec-09	Boundary Hospital	<1	<1		Tested at Caro Lab
23-Dec-09	Apt7 7560 - 21st St			NEG	Tested in House
29-Dec-09	Valley Heights Booster	<1	<1		Tested at Caro Lab
29-Dec-09	Home Hardware			NEG	Tested in House
29-Dec-09	East Zone Reservoir	<1	<1		Tested at Caro Lab
4-Jan-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
4-Jan-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
4-Jan-10	Boundary Hospital	<1	<1		Tested at Caro Lab
11-Jan-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
11-Jan-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
11-Jan-10	Boundary Hospital	<1	<1		Tested at Caro Lab
14-Jan-10	Super Save Gas			NEG	Tested In-House
14-Jan-10	Boundary Hospital	<1	<1		Tested at Caro Lab
25-Jan-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
25-Jan-10	Fire Hall			NEG	Tested In-House
25-Jan-10	East Zone Reservoir	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
1-Feb-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
1-Feb-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
1-Feb-10	Boundary Hospital	<1	<1		Tested at Caro Lab
8-Feb-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
8-Feb-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
8-Feb-10	Boundary Hospital	<1	<1		Tested at Caro Lab
11-Feb-10	Boundary Hospital	<1	<1		Tested at Caro Lab
11-Feb-10	Airport Terminal			NEG	Tested In-House
15-Feb-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
15-Feb-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
15-Feb-10	Cemetery Shack			NEG	Tested In-House
22-Feb-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
22-Feb-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
22-Feb-10	Boundary Hospital	<1	<1		Tested at Caro Lab
24-Feb-10	Super Save Gas			NEG	Tested In-House
24-Feb-10	Boundary Hospital	<1	<1		Tested at Caro Lab
1-Mar-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
1-Mar-10	Sears			NEG	Tested In-House
1-Mar-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
3-Mar-10	Boundary Hospital	<1	<1		Tested at Caro Lab
3-Mar-10	Aquatic Centre			NEG	Tested in-House
8-Mar-10	Contact Chamber			NEG	Tested in-House
10-Mar-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
10-Mar-10	GF Construction			NEG	Tested in-House
10-Mar-10	Boundary Hospital	<1	<1		Tested at Caro Lab
10-Mar-10	Bill Durham			NEG	Tested in-House
15-Mar-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
15-Mar-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
15-Mar-10	Buy Low Foods			NEG	Tested in-House
16-Mar-10	Boundary Hospital	<1	<1		Tested at Caro Lab
24-Mar-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
24-Mar-10	SPCA			NEG	Tested in-House
24-Mar-10	Firehall			NEG	Tested in-House
24-Mar-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
24-Mar-10	Boundary Hospital	<1	<1		Tested at Caro Lab
29-Mar-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
29-Mar-10	Lordco			NEG	Tested in-House
29-Mar-10	Flexus			NEG	Tested in-House
29-Mar-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
29-Mar-10	6908-17th Street			NEG	Tested in-House
6-Apr-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
6-Apr-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
6-Apr-10	Boundary Hospital	<1	<1		Tested at Caro Lab
7-Apr-10	Super Save Gas			NEG	Tested in-House
7-Apr-10	Boundary Hospital	<1	<1		Tested at Caro Lab
12-Apr-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
12-Apr-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
12-Apr-10	Curves			NEG	Tested in-House
13-Apr-10	Boundary Hospital	<1	<1		Tested at Caro Lab
13-Apr-10	BC Liquor Store			NEG	Tested in-House
19-Apr-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
19-Apr-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
19-Apr-10	Clydes Brew & Cue			NEG	Tested in-House
22-Apr-10	WWTP			NEG	Tested in-House
22-Apr-10	Boundary Hospital	<1	<1		Tested at Caro Lab
26-Apr-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
26-Apr-10	Petro Canada Gas			NEG	Tested in-House
26-Apr-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
3-May-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
3-May-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
3-May-10	Boundary Hospital	<1	<1		Tested at Caro Lab
4-May-10	Boundary Hospital	<1	<1		Tested at Caro Lab
5-May-10	City Park			NEG	Tested in-House
12-May-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
12-May-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
12-May-10	City Park			NEG	Tested in-House
19-May-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
19-May-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
19-May-10	Boundary Hospital	<1	<1		Tested at Caro Lab
26-May-10	Super Save Gas			NEG	Tested in-House
26-May-10	Boundary Hospital	<1	<1		Tested at Caro Lab
27-May-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
27-May-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
27-May-10	6144-12th St.			NEG	Tested in-House
1-Jun-10	Petro Canada			NEG	Tested in-House
1-Jun-10	Boundary Hospital	<1	<1		Tested at Caro Lab
9-Jun-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
9-Jun-10	Rec Centre			NEG	Tested in-House
9-Jun-10	Fire Hall			NEG	Tested in-House
9-Jun-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
9-Jun-10	Boundary Hospital	<1	<1		Tested at Caro Lab
14-Jun-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
14-Jun-10	East Zone Reservoir	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
14-Jun-10	Curves			NEG	Tested in-House
15-Jun-10	Grand Forks Airport			NEG	Tested in-House
15-Jun-10	Boundary Hospital	<1	<1		Tested at Caro Lab
21-Jun-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
21-Jun-10	Supersave Gas			NEG	Tested in-House
21-Jun-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Jun-10	Selkirk College			NEG	Tested in-House
23-Jun-10	Boundary Hospital	<1	<1		Tested at Caro Lab
28-Jun-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
28-Jun-10	Petro Canada			NEG	Tested in-House
28-Jun-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
29-Jun-10	Boundary Hospital	<1	<1		Tested at Caro Lab
29-Jun-10	7223-5th St.			NEG	Tested in-House
5-Jul-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
5-Jul-10	Liquor Store & More			NEG	Tested in-House
5-Jul-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
6-Jul-10	Super Save Gas			NEG	Tested in-House
6-Jul-10	Boundary Hospital	<1	<1		Tested at Caro Lab
12-Jul-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
12-Jul-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
12-Jul-10	6885-3rd St.			NEG	Tested in-House
13-Jul-10	Boundary Hospital	<1	<1		Tested at Caro Lab
13-Jul-10	129 Victoria Way			NEG	Tested in-House
19-Jul-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
19-Jul-10	Kal Tire			NEG	Tested in-House
19-Jul-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
20-Jul-10	Boundary Hospital	<1	<1		Tested at Caro Lab
20-Jul-10	6311-12th St.			NEG	Tested in-House
26-Jul-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
26-Jul-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
26-Jul-10	City Hall			NEG	Tested in-House
28-Jul-10	Boundary Hospital	<1	<1		Tested at Caro Lab
28-Jul-10	8780 Riverside Dr.			NEG	Tested in-House
3-Aug-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
3-Aug-10	McLaren Sub. N. Hydrant			NEG	Tested in-House
3-Aug-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
4-Aug-10	Boundary Hospital	<1	<1		Tested at Caro Lab
4-Aug-10	Airport			NEG	Tested in-House
8-Aug-10	Redi Electric			NEG	Tested in-House
8-Aug-10	Barbarann Park Washroom			NEG	Tested in-House
9-Aug-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
9-Aug-10	Ok Tire Car Wash			NEG	Tested in-House
9-Aug-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
16-Aug-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
16-Aug-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
16-Aug-10	Boundary Hospital	<1	<1		Tested at Caro Lab
17-Aug-10	Flexus			NEG	Tested in-House
17-Aug-10	Boundary Hospital	<1	<1		Tested at Caro Lab
23-Aug-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
23-Aug-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Aug-10	City Hall			NEG	Tested in-House
30-Aug-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
30-Aug-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
30-Aug-10	Boundary Hospital	<1	<1		Tested at Caro Lab
31-Aug-10	Petro Canada			NEG	Tested in-House
31-Aug-10	Boundary Hospital	<1	<1		Tested at Caro Lab
7-Sep-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
7-Sep-10	Riverside Washroom			NEG	Tested in-House
7-Sep-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
7-Sep-10	Boundary Hospital	<1	<1		Tested at Caro Lab
7-Sep-10	6432-8th St.			NEG	Tested in-House
13-Sep-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
13-Sep-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
13-Sep-10	Cemetery			NEG	Tested in-House
13-Sep-10	7307-22nd St.			NEG	Tested in-House
13-Sep-10	7269-22nd St.			NEG	Tested in-House
20-Sep-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
20-Sep-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
20-Sep-10	Boundary Hospital	<1	<1		Tested at Caro Lab
27-Sep-10	Lordco			NEG	Tested in-House
27-Sep-10	Boundary Hospital	<1	<1		Tested at Caro Lab
28-Sep-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
28-Sep-10	Super Save Gas			NEG	Tested in-House
28-Sep-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
6-Oct-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
6-Oct-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
6-Oct-10	Boundary Hospital	<1	<1		Tested at Caro Lab
12-Oct-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
12-Oct-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
12-Oct-10	Boundary Hospital	<1	<1		Tested at Caro Lab
13-Oct-10	Petro Canada Gas			NEG	Tested in-House
13-Oct-10	Boundary Hospital	<1	<1		Tested at Caro Lab
18-Oct-10	Valley Heights Booster	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
18-Oct-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
18-Oct-10	B.C. Liquor Store			NEG	Tested in-House
21-Oct-10	Super Save Gas			NEG	Tested in-House
21-Oct-10	Boundary Hospital	<1	<1		Tested at Caro Lab
25-Oct-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
25-Oct-10	Selkirk College			NEG	Tested in-House
25-Oct-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
8-Nov-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
8-Nov-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
8-Nov-10	Boundary Hospital	<1	<1		Tested at Caro Lab
15-Nov-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
15-Nov-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
15-Nov-10	Boundary Hospital	<1	<1		Tested at Caro Lab
17-Nov-10	Super Save			NEG	Tested in-House
17-Nov-10	Boundary Hospital	<1	<1		Tested at Caro Lab
22-Nov-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
22-Nov-10	Petro Canada			NEG	Tested in-House
22-Nov-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
29-Nov-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
29-Nov-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
29-Nov-10	Boundary Hospital	<1	<1		Tested at Caro Lab
8-Dec-10	Boundary Hospital	<1	<1		Tested at Caro Lab
8-Dec-10	Airport			NEG	Tested in-House
13-Dec-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
13-Dec-10	O.K. Tire Car Wash			NEG	Tested in-House
13-Dec-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
15-Dec-10	Cemetery			NEG	Tested in-House
15-Dec-10	Boundary Hospital	<1	<1		Tested at Caro Lab
20-Dec-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
20-Dec-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
20-Dec-10	City Hall			NEG	Tested in-House
22-Dec-10	Super Save Gas			NEG	Tested in-House
22-Dec-10	Boundary Hospital	<1	<1		Tested at Caro Lab
29-Dec-10	Valley Heights Booster	<1	<1		Tested at Caro Lab
29-Dec-10	SPCA			NEG	Tested in-House
29-Dec-10	Omega Restaurant			NEG	Tested in-House
29-Dec-10	East Zone Reservoir	<1	<1		Tested at Caro Lab
29-Dec-10	Curves			NEG	Tested in-House
10-Jan-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
10-Jan-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
10-Jan-11	Boundary Hospital	<1	<1		Tested at Caro Lab
13-Jan-11	Hutton Elementary School			NEG	Tested in-House
13-Jan-11	Boundary Hospital	<1	<1		Tested at Caro Lab
17-Jan-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
17-Jan-11	Perley Elementary School			NEG	Tested in-House
17-Jan-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
18-Jan-11	Flexus			NEG	Tested in-House
18-Jan-11	Boundary Hospital	<1	<1		Tested at Caro Lab
24-Jan-11	Video Express			NEG	Tested in-House
24-Jan-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
24-Jan-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
24-Jan-11	Curves			NEG	Tested in-House
24-Jan-11	Boundary Hospital	<1	<1		Tested at Caro Lab
31-Jan-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
31-Jan-11	Super Save Gas			NEG	Tested in-House
31-Jan-11	Petro			NEG	Tested in-House
31-Jan-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
31-Jan-11	City Hall			NEG	Tested in-House
7-Feb-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
7-Feb-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
7-Feb-11	Boundary Hospital	<1	<1		Tested at Caro Lab
9-Feb-11	Public Works Yard			NEG	Tested in-House
9-Feb-11	Boundary Hospital	<1	<1		Tested at Caro Lab
14-Feb-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
14-Feb-11	Fire Hall			NEG	Tested in-House
14-Feb-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
17-Feb-11	Community Futures			NEG	Tested in-House
17-Feb-11	Boundary Hospital	<1	<1		Tested at Caro Lab
28-Feb-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
28-Feb-11	Sears			NEG	Tested in-House
28-Feb-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
2-Mar-11	Super Save Gas			NEG	Tested in-House
2-Mar-11	Boundary Hospital	<1	<1		Tested at Caro Lab
7-Mar-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
7-Mar-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
7-Mar-11	6311-12th St.			NEG	Tested in-House
8-Mar-11	Petro Canada			NEG	Tested in-House
8-Mar-11	Boundary Hospital	<1	<1		Tested at Caro Lab
14-Mar-11	Works Yard			NEG	Tested in-House
14-Mar-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
14-Mar-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
14-Mar-11	Boundary Hospital	<1	<1		Tested at Caro Lab
14-Mar-11	6337-Como St.			NEG	Tested in-House

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
21-Mar-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
21-Mar-11	Liquor Store N More			NEG	Tested in-House
21-Mar-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Mar-11	Boundary Hospital	<1	<1		Tested at Caro Lab
23-Mar-11	Airport			NEG	Tested in-House
28-Mar-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
28-Mar-11	Sun Valley Car Wash			NEG	Tested in-House
28-Mar-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
30-Mar-11	Petro Canada			NEG	Tested in-House
30-Mar-11	Boundary Hospital	<1	<1		Tested at Caro Lab
4-Apr-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
4-Apr-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
4-Apr-11	City Hall			NEG	Tested in-House
11-Apr-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
11-Apr-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
11-Apr-11	Boundary Hospital	<1	<1		Tested at Caro Lab
18-Apr-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
18-Apr-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
18-Apr-11	Boundary Hospital	<1	<1		Tested at Caro Lab
27-Apr-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
27-Apr-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
27-Apr-11	Boundary Hospital	<1	<1		Tested at Caro Lab
3-May-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
3-May-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
3-May-11	Boundary Hospital	<1	<1		Tested at Caro Lab
9-May-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
9-May-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
9-May-11	Boundary Hospital	<1	<1		Tested at Caro Lab
11-May-11	Petro Canada			NEG	Tested in-House
11-May-11	Boundary Hospital	<1	<1		Tested at Caro Lab
16-May-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
16-May-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
16-May-11	Curves			NEG	Tested in-House
18-May-11	Super Save Gas			NEG	Tested in-House
18-May-11	Boundary Hospital	<1	<1		Tested at Caro Lab
24-May-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
24-May-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
24-May-11	Boundary Hospital	<1	<1		Tested at Caro Lab
24-May-11	BC Liquor Store			NEG	Tested in-House
29-May-11	Cemetery			NEG	Tested in-House
29-May-11	6660-10th St.			NEG	Tested in-House
29-May-11	6155-12th St.			NEG	Tested in-House
29-May-11	131-Central			NEG	Tested in-House
30-May-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
30-May-11	Super Save Gas			NEG	Tested in-House
30-May-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
30-May-11	Boundary Hospital	<1	<1		Tested at Caro Lab
30-May-11	6337-Como Street	<1	<1		Tested at Caro Lab
31-May-11	Sun Valley Car Wash			NEG	Tested in-House
31-May-11	Petro Canada			NEG	Tested in-House
31-May-11	Airport			NEG	Tested in-House
31-May-11	6144 Johnson Flats	<1	<1		Tested at Caro Lab
1-Jun-11	Barbarann Park Washroom			NEG	Tested in-House
1-Jun-11	Angus McDonald Washroom			NEG	Tested in-House
6-Jun-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
6-Jun-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
6-Jun-11	8120 Donaldson Drive			NEG	Tested in-House
8-Jun-11	Kal Tire			NEG	Tested in-House
8-Jun-11	Boundary Hospital	<1	<1		Tested at Caro Lab
13-Jun-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
13-Jun-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
13-Jun-11	Cemetery			NEG	Tested in-House
14-Jun-11	Flexus			NEG	Tested in-House
14-Jun-11	Boundary Hospital	<1	<1		Tested at Caro Lab
16-Jun-11	East Zone Reservoir #2			NEG	Tested in-House
16-Jun-11	East Zone Reservoir #1			NEG	Tested in-House
16-Jun-11	East Zone Reservoir #1	<1	<1		Tested at Caro Lab
16-Jun-11	6144-12th St.			NEG	Tested in-House
20-Jun-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
20-Jun-11	East Zone Reservoir #2	<1	<1		Tested at Caro Lab
20-Jun-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Jun-11	East Zone Reservoir #1	<1	<1		Tested at Caro Lab
23-Jun-11	Boundary Hospital	<1	<1		Tested at Caro Lab
27-Jun-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
27-Jun-11	Petro Canada			NEG	Tested in-House
27-Jun-11	East Zone Reservoir #2	<1	<1		Tested at Caro Lab
27-Jun-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
4-Jul-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
4-Jul-11	Roxul			NEG	Tested in-House
4-Jul-11	Interfor Office			NEG	Tested in-House
4-Jul-11	Interfor J-Bar			NEG	Tested in-House
4-Jul-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
4-Jul-11	Boundary Hospital	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
4-Jul-11	Boundary Hospital	<1	<1		Tested at Caro Lab
11-Jul-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
11-Jul-11	Interfor	<1	<1		Tested at Caro Lab
11-Jul-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
13-Jul-11	Super Save Gas			NEG	Tested in-House
13-Jul-11	Boundary Hospital	<1	<1		Tested at Caro Lab
18-Jul-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
18-Jul-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
18-Jul-11	City Hall			NEG	Tested in-House
20-Jul-11	Curves			NEG	Tested in-House
20-Jul-11	Boundary Hospital	<1	<1		Tested at Caro Lab
25-Jul-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
25-Jul-11	Petro Canada			NEG	Tested in-House
25-Jul-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
26-Jul-11	Super Save Gas			NEG	Tested in-House
26-Jul-11	Boundary Hospital	<1	<1		Tested at Caro Lab
2-Aug-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
2-Aug-11	GF Fire Hall			NEG	Tested in-House
2-Aug-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
3-Aug-11	Petro Canada			NEG	Tested in-House
3-Aug-11	Boundary Hospital	<1	<1		Tested at Caro Lab
8-Aug-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
8-Aug-11	Lordco			NEG	Tested in-House
8-Aug-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
11-Aug-11	City Works Yard			NEG	Tested in-House
11-Aug-11	Boundary Hospital	<1	<1		Tested at Caro Lab
15-Aug-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
15-Aug-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
15-Aug-11	2348 - Central			NEG	Tested in-House
22-Aug-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
22-Aug-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
22-Aug-11	Boundary Hospital	<1	<1		Tested at Caro Lab
29-Aug-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
29-Aug-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
29-Aug-11	Boundary Hospital	<1	<1		Tested at Caro Lab
30-Aug-11	City Works Yard			NEG	Tested in-House
30-Aug-11	Boundary Hospital	<1	<1		Tested at Caro Lab
2-Sep-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
2-Sep-11	Super Save Gas			NEG	Tested in-House
2-Sep-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
8-Sep-11	Hutton School			NEG	Tested in-House
8-Sep-11	Boundary Hospital	<1	<1		Tested at Caro Lab
8-Sep-11	Omega II	<1	<1		Tested at Caro Lab
8-Sep-11	Hutton School	<1	<1		Tested at Caro Lab
8-Sep-11	Boundary Hospital	<1	<1		Tested at Caro Lab
12-Sep-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
12-Sep-11	Super Save Gas			NEG	Tested in-House
12-Sep-11	Perley Change Room			NEG	Tested in-House
12-Sep-11	Evergreen Cemetery			NEG	Tested in-House
12-Sep-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
19-Sep-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
19-Sep-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
19-Sep-11	Boundary Hospital	<1	<1		Tested at Caro Lab
26-Sep-11	Works Yard			NEG	Tested in-House
26-Sep-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
26-Sep-11	Boundary Hospital	<1	<1		Tested at Caro Lab
26-Sep-11	Boundary Hospital	<1	<1		Tested at Caro Lab
3-Oct-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
3-Oct-11	Petro Canada			NEG	Tested in-House
3-Oct-11	Perley School			NEG	Tested in-House
3-Oct-11	Hutton School			NEG	Tested in-House
3-Oct-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
11-Oct-11	Contact Chamber			NEG	Tested in-House
11-Oct-11	Boundary Hospital	<1	<1		Tested at Caro Lab
17-Oct-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
17-Oct-11	Super Save Gas			NEG	Tested in-House
17-Oct-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
24-Oct-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
24-Oct-11	Hutton School			NEG	Tested in-House
24-Oct-11	G.F.S.S. (High School)			NEG	Tested in-House
24-Oct-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
24-Oct-11	Boundary Hospital	<1	<1		Tested at Caro Lab
31-Oct-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
31-Oct-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
31-Oct-11	Boundary Hospital	<1	<1		Tested at Caro Lab
7-Nov-11	Grand Forks Construction			NEG	Tested in-House
7-Nov-11	Boundary Hospital	<1	<1		Tested at Caro Lab
7-Nov-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
7-Nov-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
7-Nov-11	City Hall			NEG	Tested in-House
14-Nov-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
14-Nov-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
14-Nov-11	Boundary Hospital	<1	<1		Tested at Caro Lab

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
17-Nov-11	City Hall			NEG	Tested in-House
17-Nov-11	Boundary Hospital	<1	<1		Tested at Caro Lab
21-Nov-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
21-Nov-11	Super Save Gas			NEG	Tested in-House
21-Nov-11	Sears			NEG	Tested in-House
21-Nov-11	Hutton School			NEG	Tested in-House
21-Nov-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
28-Nov-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
28-Nov-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
28-Nov-11	Boundary Hospital	<1	<1		Tested at Caro Lab
30-Nov-11	Boundary Hospital	<1	<1		Tested at Caro Lab
30-Nov-11	BC Liquor Store			NEG	Tested in-House
5-Dec-11	Petro Canada			NEG	Tested in-House
5-Dec-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
5-Dec-11	Boundary Hospital	<1	<1		Tested at Caro Lab
7-Dec-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
7-Dec-11	Hutton School			NEG	Tested in-House
12-Dec-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
12-Dec-11	Petro Canada			NEG	Tested in-House
12-Dec-11	Fire Hall			NEG	Tested in-House
12-Dec-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
12-Dec-11	Aquatic Centre			NEG	Tested in-House
19-Dec-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
19-Dec-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
19-Dec-11	Boundary Hospital	<1	<1		Tested at Caro Lab
20-Dec-11	Boundary Hospital	<1	<1		Tested at Caro Lab
28-Dec-11	Valley Heights Booster	<1	<1		Tested at Caro Lab
28-Dec-11	East Zone Reservoir	<1	<1		Tested at Caro Lab
28-Dec-11	Boundary Hospital	<1	<1		Tested at Caro Lab
29-Dec-11	Super Save Gas			NEG	Tested in-House
29-Dec-11	G.F. Public Library			NEG	Tested in-House
3-Jan-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
3-Jan-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
3-Jan-12	BC Liquor Store			NEG	Tested in-House
5-Jan-12	Hutton School			NEG	Tested in-House
5-Jan-12	Boundary Hospital	<1	<1		Tested at Caro Lab
9-Jan-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
9-Jan-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
9-Jan-12	Cemetery			NEG	Tested in-House
10-Jan-12	Super Save Gas			NEG	Tested in-House
10-Jan-12	Boundary Hospital	<1	<1		Tested at Caro Lab
16-Jan-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
16-Jan-12	Fire Hall			NEG	Tested in-House
16-Jan-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
17-Jan-12	Petro Canada			NEG	Tested in-House
17-Jan-12	Boundary Hospital	<1	<1		Tested at Caro Lab
26-Jan-12	Super Save Gas			NEG	Tested in-House
26-Jan-12	Lordco Auto Parts			NEG	Tested in-House
30-Jan-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
30-Jan-12	Public Works Yard			NEG	Tested in-House
30-Jan-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
31-Jan-12	Boundary Hospital	<1	<1		Tested at Caro Lab
31-Jan-12	Aquatic Centre			NEG	Tested in-House
6-Feb-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
6-Feb-12	Super Save Gas			NEG	Tested in-House
6-Feb-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
6-Feb-12	City Hall			NEG	Tested in-House
6-Feb-12	6311-12th Street			NEG	Tested in-House
13-Feb-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
13-Feb-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
13-Feb-12	Boundary Hospital	<1	<1		Tested at Caro Lab
15-Feb-12	Hutton School			NEG	Tested in-House
15-Feb-12	Boundary Hospital	<1	<1		Tested at Caro Lab
20-Feb-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
20-Feb-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
20-Feb-12	City Hall			NEG	Tested in-House
21-Feb-12	Works Yard			NEG	Tested in-House
21-Feb-12	Boundary Hospital	<1	<1		Tested at Caro Lab
27-Feb-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
27-Feb-12	Petro Canada			NEG	Tested
27-Feb-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
5-Mar-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
5-Mar-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
5-Mar-12	Boundary Hospital	<1	<1		Tested at Caro Lab
14-Mar-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
14-Mar-12	Super Save Gas			NEG	Tested in-House
14-Mar-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
14-Mar-12	Boundary Hospital	<1	<1		Tested at Caro Lab
14-Mar-12	Boundary Hospital	<1	<1		Tested at Caro Lab
19-Mar-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
19-Mar-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
19-Mar-12	City Hall			NEG	Tested in-House
26-Mar-12	Works Yard			NEG	Tested in-House

**City of Grand Forks Water System
Summary of Bacteriological Results**

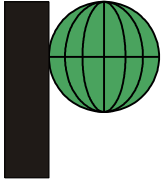
Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
26-Mar-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
26-Mar-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
26-Mar-12	Boundary Hospital	<1	<1		Tested at Caro Lab
26-Mar-12	Boundary Hospital	<1	<1		Tested at Caro Lab
2-Apr-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
2-Apr-12	Hutton School			NEG	Tested in-House
2-Apr-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
2-Apr-12	City Hall			NEG	Tested in-House
2-Apr-12	Cemetery			NEG	Tested in-House
10-Apr-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
10-Apr-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
10-Apr-12	Boundary Hospital	<1	<1		Tested at Caro Lab
11-Apr-12	Petro Canada			NEG	Tested in-House
11-Apr-12	Boundary Hospital	<1	<1		Tested at Caro Lab
16-Apr-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
16-Apr-12	Tom Kat			NEG	Tested in-House
16-Apr-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Apr-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
23-Apr-12	Super Save Gas			NEG	Tested in-House
23-Apr-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Apr-12	Boundary Hospital	<1	<1		Tested at Caro Lab
23-Apr-12	Boundary Hospital	<1	<1		Tested at Caro Lab
26-Apr-12	City Hall			NEG	Tested in-House
30-Apr-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
30-Apr-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
30-Apr-12	Boundary Hospital	<1	<1		Tested at Caro Lab
1-May-12	Cemetery			NEG	Tested in-House
1-May-12	Boundary Hospital	<1	<1		Tested at Caro Lab
7-May-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
7-May-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
7-May-12	Aquatic Centre			NEG	Tested in-House
22-May-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
22-May-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
22-May-12	Boundary Hospital	<1	<1		Tested at Caro Lab
28-May-12	Well #3	<1	<1		Tested at Caro Lab
28-May-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
28-May-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
28-May-12	Boundary Hospital	<1	<1		Tested at Caro Lab
28-May-12	Boundary Hospital	<1	<1		Tested at Caro Lab
29-May-12	Super Save Gas			NEG	Tested in-House
29-May-12	Boundary Hospital	<1	<1		Tested at Caro Lab
4-Jun-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
4-Jun-12	Petro Canada			NEG	Tested in-House
4-Jun-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
5-Jun-12	Works Yard			NEG	Tested in-House
5-Jun-12	Boundary Hospital	<1	<1		Tested at Caro Lab
11-Jun-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
11-Jun-12	East Zone Reservoir			NEG	Tested in-House
11-Jun-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
11-Jun-12	Aquatic Centre			NEG	Tested in-House
18-Jun-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
18-Jun-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
18-Jun-12	Boundary Hospital	<1	<1		Tested at Caro Lab
19-Jun-12	Boundary Hospital	<1	<1		Tested at Caro Lab
19-Jun-12	Aquatic Centre			NEG	Tested in-House
25-Jun-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
25-Jun-12	Super Save Gas			NEG	Tested in-House
25-Jun-12	Fire Hall			NEG	Tested in-House
25-Jun-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
25-Jun-12	City Hall			NEG	Tested in-House
28-Jun-12	Boundary Hospital	<1	<1		Tested at Caro Lab
3-Jul-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
3-Jul-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
3-Jul-12	7619 Granby Rd.			NEG	Tested in-House
4-Jul-12	Boundary Hospital	<1	<1		Tested at Caro Lab
9-Jul-12	Video Store			NEG	Tested in-House
9-Jul-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
9-Jul-12	Selkirk College			NEG	Tested in-House
9-Jul-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
9-Jul-12	Barbra Ann Washroom	<1	<1		Tested at Caro Lab
16-Jul-12	Valley Heights Booster			NEG	Tested in-House
16-Jul-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
16-Jul-12	Super Save Gas			NEG	Tested in-House
16-Jul-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
16-Jul-12	City Hall			NEG	Tested in-House
16-Jul-12	Boundary Hospital	<1	<1		Tested at Caro Lab
23-Jul-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
23-Jul-12	Fire Hall			NEG	Tested in-House
23-Jul-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
23-Jul-12	Boundary Hospital	<1	<1		Tested at Caro Lab
23-Jul-12	Boundary Hospital	<1	<1		Tested at Caro Lab
30-Jul-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
30-Jul-12	Super Save Gas			NEG	Tested in-House

**City of Grand Forks Water System
Summary of Bacteriological Results**

Date of Sample	Sample Site	Total Coliform	E. COLI	Presence / Absence	Comments
30-Jul-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
1-Aug-12	Super Save Gas			NEG	Tested in-House
1-Aug-12	Boundary Hospital	<1	<1		Tested at Caro Lab
1-Aug-12	Aquatic Centre			NEG	Tested in-House
7-Aug-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
7-Aug-12	Fire Hall			NEG	Tested in-House
7-Aug-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
8-Aug-12	Super Save Gas				Tested in-House
8-Aug-12	Boundary Hospital	<1	<1		Tested at Caro Lab
14-Aug-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
14-Aug-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
14-Aug-12	Barbra Ann Park			NEG	Tested in-House
20-Aug-12	Valley Heights Booster	<1	<1		Tested at Caro Lab
20-Aug-12	East Zone Reservoir	<1	<1		Tested at Caro Lab
20-Aug-12	Boundary Hospital	<1	<1		Tested at Caro Lab
July 29 2008	Valley Heights Booster	<1	<1		Tested at Caro Lab
July 29 2008	East Zone Reservoir	<1	<1		Tested at Caro Lab
July 29 2008	City Hall	<1	<1		Tested at Caro Lab
July 29 2008	Boundary Hospital	<1	<1		Tested at Caro Lab

APPENDIX D

GROUNDWATER MODELLING ANALYSIS TECHNICAL MEMO



PITEAU ASSOCIATES
GEOTECHNICAL AND
HYDROGEOLOGICAL CONSULTANTS

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MEMORANDUM

TO: Remi Allard, P. Eng., Piteau Associates Our file: 3181 (3181-M002)
Date: October 26, 2012

FROM: Matthew Cleary, P.Geo.
Email: mcleary@piteau.com

RE: Assessment of Well Capture Zones using Numerical Modeling Techniques
Grand Forks Aquifer, B.C.

As part of the current assessment of groundwater management options being completed by Piteau Associates Engineering Ltd. (Piteau) for the City of Grand Forks (the City), we are providing this technical memorandum summarizing the updated capture zone estimates for various existing and proposed City wells using numerical modeling techniques. The primary objectives of this component of the groundwater assessments are as follows:

- to refine the capture zone estimates for existing City wells;
- to estimate the capture zone of a new well placed adjacent to well TW99-2;
- to estimate the capture zones for various configurations and flow rates for a new well constructed between well pairing GF #3 / #3a and Kettle River; and
- to assess the results of the numerical analyses to determine the best configuration of new well(s) to minimize well interference effects.

Special thanks are given to Dr. Diana Allen, a professor in hydrogeology at Simon Fraser University (SFU) for her assistance with portions of the numerical analyses.

NUMERICAL MODELING SUMMARY FOR THE GRAND FORKS AQUIFER

Numerical modeling efforts focused on the Grand Forks aquifer were initially conducted by Dr. Diana Allen, SFU (Allen, D.M., 2000). The numerical model was developed as a three-dimensional finite-difference groundwater flow model using the MODFLOW-96 code (McDonald, M.G., et al., 1988), and utilized the MODPATH (Pollock, D.W., 1994) post-processing package for particle tracking.

Additional efforts to refine the numerical model were conducted in 2001 (Allen, D.M., 2001) and 2004 (Scibek, J. and Allen, D.M., 2004), which incorporated additional complexity including more refined definition of stratigraphic and bedrock contacts, and spatially-distributed recharge as determined using the HELP model developed by the U.S. Environmental Protection Agency (Schroeder, P. R. et al., 1994).

The Visual MODFLOW software package (v. 3.1.0.84), developed by Waterloo Hydrogeologic Inc. (WHI, 2000), was used for this study, and provides a graphical interface to the MODFLOW-96 modeling code.

MODEL DESCRIPTION

The objective for the numerical modeling exercise was to utilize the aforementioned groundwater numerical model in conjunction with MODPATH to define groundwater capture zones for wells operated by the City, as well as possible well locations adjacent to TW99-2 and between well pairing GF #3 / #3a and the Kettle River (GF #6).

The model was constructed over a region measuring 7.0 km from north to south by 16.0 km from east to west. The finite-difference mesh was divided into 312 columns, 206 rows, and six layers. Portions of the model were left as inactive, corresponding with bedrock, as groundwater flow within bedrock is not considered to be significant in comparison to flow within unconsolidated sediments.

Boundary conditions utilized in the model consist of surface recharge, specified head boundaries, drain boundaries, and no flow boundaries. As previously mentioned, surface recharge was determined using the HELP model, and defined 64 different recharge zones. Specified head boundary conditions were applied along the reaches of the Kettle and Granby Rivers, with values representative of January stage height, which is considered equivalent to base flow conditions (Allen, D.M., 2012). Drain boundary conditions were applied to areas representing less significant surface water features, including small lakes. The edges of the active model area, both in the horizontal plane and beneath the unconsolidated sediments, represent the bedrock contact, and were modeled as no flow boundaries.

Hydraulic parameters for unconsolidated sediments were discretized into four layers, representing two upper aquifer layers and two lower aquitard layers, as presented below:

Model Layer	Description	K_x (m/s)	K_y (m/s)	K_z (m/s)
1	Gravel (aquifer)	1.0×10^{-3}	1.0×10^{-3}	1.0×10^{-4}
2	Sand (aquifer)	1.5×10^{-4}	1.5×10^{-4}	1.5×10^{-5}
3	Silt (aquitard)	7.0×10^{-7}	7.0×10^{-7}	7.0×10^{-8}
4	Clay (aquitard)	1.0×10^{-7}	1.0×10^{-8}	1.0×10^{-8}
5	Bedrock (inactive)	-	-	-
6		-	-	-

Simulations detailed below were conducted in steady-state, and while a transient model was available for use, it was indicated to be quite cumbersome and often times had difficulty finding a stable solution due to the complexity of some of the transient boundary conditions (i.e. recharge and variable specified head boundaries).

CAPTURE ZONE ESTIMATION

Capture zone estimation was conducted using the aforementioned MODPATH post-processing package. A circle of twenty backward tracking particles were placed around each well at a radius of 50m, within each of layers 1 through 4. The backward tracking particles outline capture zones for each of the wells for a specified flow rate. Tick marks along the particle path lines represent a

time spacing of 30 days, while the ultimate length of the path lines define the 365 days (one-year) capture zone for each well. Capture zones displayed on Figs. 2 through 9 represent the projection of backward tracking particles within layer 2 of the numerical model.

Eight different scenarios were simulated using various combinations of active pumping at wells, and multiple locations and flow rates for the proposed well GF #6. These scenarios are described herein as well as in Table 1.

Scenario 1

Scenario 1 includes pumping at the five existing wells (GF #2, #3, #3a, #4, and #5) at pumping rates of 24.3, 75.7, 30.0, 25.3, and 69.4 L/s, respectively. The one-year capture zones for the well pairing GF #4 / #5 extends radially outward due to the lesser hydraulic gradient in the vicinity of the wells. The one-year capture zones for well pairing GF #3 / #3a and well GF #2 extend from the well heads towards the Kettle River to the southwest; however they do not intersect the Kettle River within this timeframe. The one-year capture zones for well pairings GF #3 / #3a and GF #4 / #5, and well GF #2 do not overlap when operated concurrently; therefore, it is anticipated that well interference between the two well pairings and well GF #2 is minimal.

Scenario 2

Scenario 2 includes pumping at the five existing wells at the rates specified in Scenario 1, as well as the operation of a well adjacent to TW99-2 at 44.2 L/s. As with the wells operated in Scenario 1, the one-year capture zone for TW99-2 does not intersect the capture zones for well pairings GF #3 / #3a and GF #4 / #5, or well GF #2. The one-year capture zone for a well adjacent to TW99-2 extends radially outward due to the minimal hydraulic gradient in the vicinity of the well.

Scenario 3

Scenario 3 includes pumping at the five existing wells at the rates specified in Scenario 1, as well as the operation of a proposed well GF #6 at 44.2 L/s. The proposed location for GF #6 for this scenario is west of the intersection of 65th Avenue and 24th Street. The one-year capture zone for proposed well GF #6 extends from the well head towards the Kettle River to the southwest, and like well pairing GF #3 / #3a does not intersect the Kettle River within this timeframe. The one-year capture zones for well pairing GF #3 / #3a and proposed well GF #6 do intersect, and therefore it is anticipated that there will be some measureable reduction in available drawdown in the wells after longer sustained concurrent pumping. As it is not anticipated that wells GF #3 and GF #3a will be operated concurrently at full capacity, the reduction in available drawdown will likely be lesser than that of this scenario.

Scenario 4

Scenario 4 includes pumping at the five existing wells at the rates specified in Scenario 1, as well as the operation of well GF #6 and a well adjacent to TW99-2 at rates of 44.2 L/s each. No significant change in the one-year capture zones can be observed as a result of active pumping at the aforementioned seven well locations when compared to the results of Scenarios 2 and 3.

Scenario 5

Scenario 5 includes pumping at the five existing wells at the rates specified in Scenario 1, as well as the operation of proposed well GF #6 at 44.2 L/s. The proposed location for GF #6 for this scenario is east of the intersection of 65th Avenue and 24th Street, along Kettle River Drive. The one-year capture zone for proposed well GF #6 extends from the well head towards the Kettle River to the south. The capture zone does not intersect that of the well pairing GF #3 / #3a nor the Kettle River within this timeframe. Well interference effects observed at the other wells are therefore not anticipated associated with this well configuration and pumping rate for well GF #6.

Scenario 6

Scenario 6 includes pumping at the five existing wells at the rates specified in Scenario 1, as well as the operation of proposed well GF #6 at 44.2 L/s. The proposed location for GF #6 for this scenario is south of well pairing GF #3 / #3a on 25th Street. The one-year capture zone for proposed well GF #6 extends from the well head towards the Kettle River to the south. The capture zone does not intersect that of the well pairing GF #3 / #3a nor the Kettle River in this timeframe. Therefore, well interference effects are not anticipated associated with this well configuration and pumping rate for well GF #6.

Scenario 7

Scenario 7 includes the same well configuration as Scenario 5, with an increased pumping rate for GF #6 (63.1 L/s). The one-year capture zone for proposed well GF #6 extends from the well head and intersects the Kettle River to the south. The capture zone does not intersect that of the well pairing GF #3 / #3a, therefore well interference effects are not anticipated for this well configuration and increased pumping rate at well GF #6.

Scenario 8

Scenario 8 includes the same well configuration as Scenario 6, with an increased pumping rate for GF #6 (63.1 L/s). The one-year capture zone for proposed well GF #6 extends from the well head and intersects the Kettle River to the south and southwest. The capture zone does not intersect that of the well pairing GF #3 / #3a, therefore well interference effects are not anticipated to be significant for this well configuration and increased pumping rate at well GF #6.

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